# LEROY SOMER ®

This manual is to be given to the end user



| | | |
|---|---|---|
| 1 | | 0V |
| 2 | RP | Reference A1 (analogue voltage input) |
| 3 | | +10V |
| 4 | | 0V (negative logic) |
| 5 | | Reference A2 (analogue current input) |
| 6 | | Analogue output (motor frequency) |
| PL1 7 | | +24V (positive logic) |
| 8 | | Logic output (zero frequency) |
| 9 | | Unlock |
| 10 | | Run forward/Stop |
| 11 | | Run reverse/Stop |
| 12 | | A1/A2 reference selection |
| 13 | | Jog (see 15 in section 4.8) |
| 14 | | |
| PL2 15 | | Fault relay |
| 16 | | |

# DIGIDRIVE

## Variable speed drive

### Installation and commissioning

### NOTE

**LEROY-SOMER** reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document may therefore be changed without notice.

**LEROY-SOMER** gives no contractual guarantee whatsoever concerning the information published in this document and cannot be held responsible for any errors it may contain, nor for any damage resulting from its use.

### CAUTION

For the user's own safety, this variable speed drive must be connected to an approved earth ( ⏚ terminal).

If accidentally starting the installation is likely to cause a risk to personnel or the machines being driven, it is essential to supply the equipment via a circuit-breaking device (power contactor) which can be controlled via an external safety system (emergency stop, detection of errors on the installation).

The variable speed drive is fitted with safety devices which, in the event of a fault, control stopping and thus stop the motor. The motor itself can become jammed for mechanical reasons. Voltage fluctuations, and in particular power cuts, may also cause the motor to stop. The removal of the causes of the shutdown can lead to restarting, which may be dangerous for certain machines or installations.
In such cases, it is essential that the user takes appropriate precautions against the motor restarting after an unscheduled stop.

The variable speed drive is designed to be able to supply a motor and the driven machine above its rated speed.
If the motor or the machine are not mechanically designed to withstand such speeds, the user may be exposed to serious danger resulting from their mechanical deterioration.
It is important that the user checks that the installation can withstand it before programming a high speed.

The variable speed drive which is the subject of this manual is designed to be integrated in an installation or an electrical machine, and can under no circumstances be considered to be a safety device. It is therefore the responsibility of the machine manufacturer, the designer of the installation or the user to take all necessary precautions to ensure that the system complies with current standards, and to provide any devices required to ensure the safety of equipment and personnel.

**LEROY-SOMER declines all responsibility in the event of the above recommendations not being observed.**

Manual corresponding to software versions ≥ **V02.00.01**
Update to manual 3218 GB - 4.33/c - 03.01

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# DIGIDRIVE
## Variable speed drive

**SAFETY AND OPERATING INSTRUCTIONS FOR VARIABLE SPEED DRIVES (in accordance with the low voltage directive 73/23/EEC modified by 93/68/EEC)**

⚠ **• Throughout the manual this symbol warns of consequences which may arise from inappropriate use of the drive, since electrical risks may lead to material or physical damage as well as constituting a fire hazard.**

### 1 - General

Depending on their degree of protection, the variable speed drives may contain unprotected live parts, which may be moving or rotating, as well as hot surfaces, during operation.

Unjustified removal of protection devices, incorrect use, faulty installation or inappropriate operation could represent a serious risk to personnel, animals and equipment.

For further information, consult the manual.

All work relating to transportation, installation, commissioning and maintenance must be performed by experienced, qualified personnel (see IEC 364 or CENELEC HD 384, or DIN VDE 0100 and national specifications for installation and accident prevention).

In these basic safety instructions, qualified personnel means persons competent to install, mount, commission and operate the product and possessing the relevant qualifications.

### 2 - Use

Variable speed drives are components designed for integration in installations or electrical machines.

When integrated in a machine, commissioning must not take place until it has been verified that the machine conforms with directive 97/37/EEC (Machinery Directive). It is also necessary to comply with standard EN 60024, which stipulates in particular that electrical actuators (which include variable speed drives) cannot be considered as circuit-breaking devices and certainly not as isolating switches.

Commissioning can take place only if the requirements of the Electromagnetic Compatibility Directive (89/336/EEC, modified by 92/31/EEC) are met.

The variable speed drives meet the requirements of the Low Voltage Directive 73/23/EEC, modified by 93/68/EEC. The harmonised standards of the DIN VDE 0160 series in connection with standard VDE 0660, part 500 and EN 60146/VDE 0558 are also applicable.

The technical characteristics and instructions concerning the connection conditions specified on the nameplate and in the documentation provided must be observed without fail.

### 3 - Transportation, storage

All instructions concerning transportation, storage and correct handling must be observed.

The climatic conditions specified in the technical manual must be observed.

### 4 - Installation

The installation and cooling of equipment must comply with the specifications in the manual supplied with the product.

The variable speed drives must be protected against any excessive stress. In particular, there must be no damage to parts and/or modification of the clearance between components during transportation and handling. Avoid touching the electronic components and contact parts.

The variable speed drives contain parts which are sensitive to electrostatic stresses and may be easily damaged if handled incorrectly. Electrical components must not be exposed to mechanical damage or destruction (risks to health !).

### 5 - Electrical connection

When work is performed on variable speed drives which are powered up, the national accident prevention regulations must be respected.

The electrical installation must comply with the relevant specifications (for example conductor cross-sections, protection via fused circuit-breaker, connection of protective conductor). More detailed information is given in the manual.

Instructions for an installation which meets the requirements for electromagnetic compatibility, such as screening, earthing, presence of filters and correct insertion of cables and conductors, are given in the documentation supplied with the variable speed drives.

These instructions must be followed in all cases, even if the variable speed drive carries the CE mark. Adherence to the limits given in the EMC legislation is the responsibility of the manufacturer of the installation or the machine.

### 6 - Operation

Installations in which variable speed drives are to be integrated must be fitted with additional protection and monitoring devices as laid down in the current relevant safety regulations, such as the law on technical equipment, accident prevention regulations, etc. Modifications to the variable speed drives using control software are permitted.

Active parts of the device and the live power connections must not be touched immediately after the variable speed drive is powered down, as the capacitors may still be charged. In view of this, the warnings fixed to the variable speed drives must be observed.

During operation, all doors and protective covers must be kept closed.
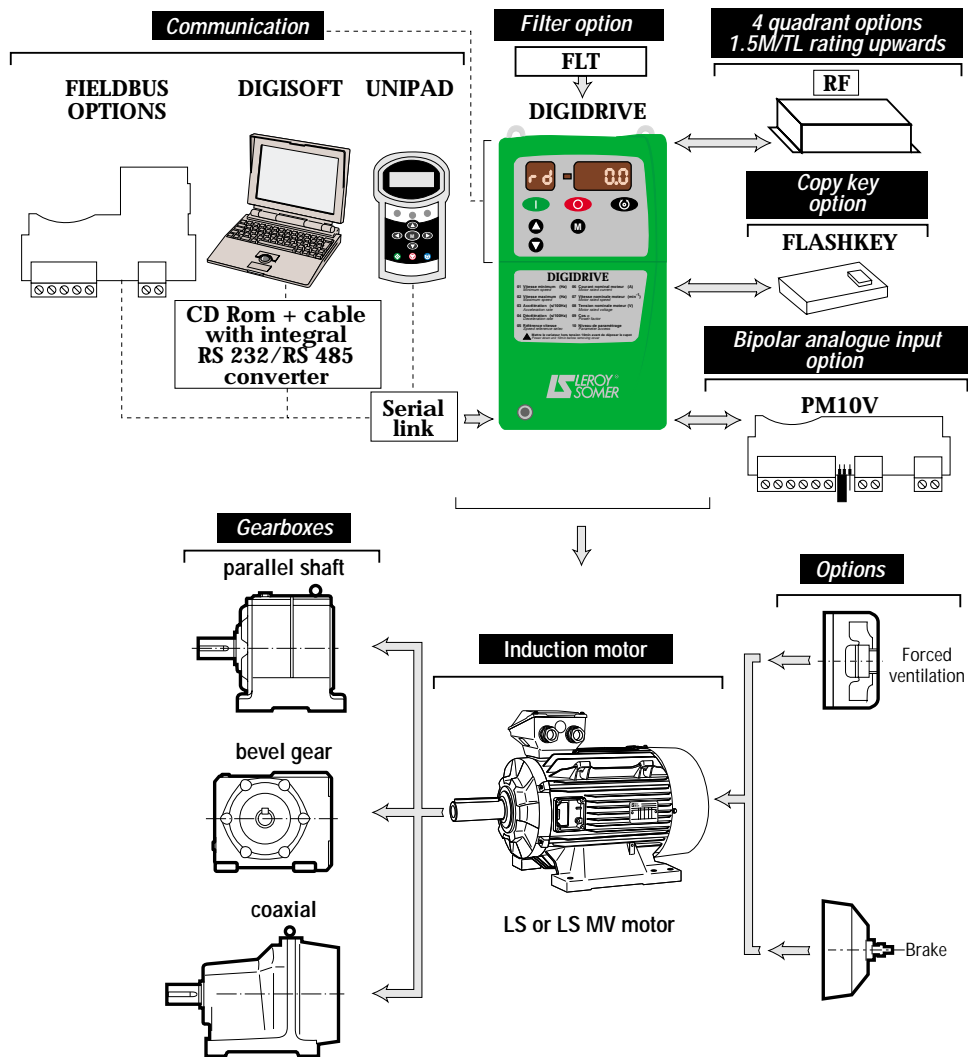
### 7 - Servicing and maintenance

Refer to the manufacturer's documentation.

**This manual is to be given to the end user.**

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# DIGIDRIVE
## Variable speed drive

## FOREWORD

This manual describes the commissioning of DIGIDRIVE digital technology variable speed drives. It gives details of all the procedures to be carried out during intervention on the drive and presents the various extensions available.

**Notes**

# DIGIDRIVE
# Variable speed drive

**CONTENTS**

# DIGIDRIVE
## Variable speed drive

## 1 - GENERAL INFORMATION

### 1.1 - General operating principle

The DIGIDRIVE is an AC drive for supplying induction motors.

It is an open loop flux vector drive.

Due to its processing power, the drive controls the magnetising current and the active current separately with a standard induction motor.

The speed and position of the rotor are calculated to control the torque and speed of the motor.

This open loop mode of operation gives very high performance levels and is suitable for most applications.

### 1.1.1 - Power module

The DIGIDRIVE uses an IGBT transistor inverter bridge.

This leading-edge technology considerably reduces the noise and temperature rise of the variable speed motor.

The performance of the DIGIDRIVE is totally compatible with use in all 4 quadrants of the torque-speed plane (from 1.5M/TL rating upwards).
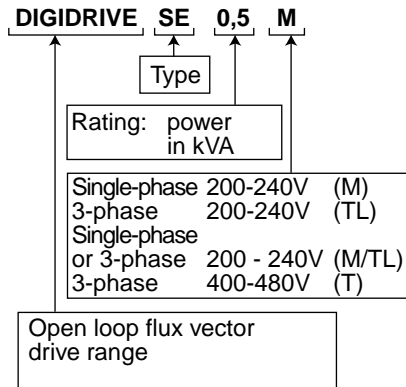
During periods of operation as a generator, the energy restored by the motor is dissipated by the resistors.

### 1.1.2 - Synoptic view
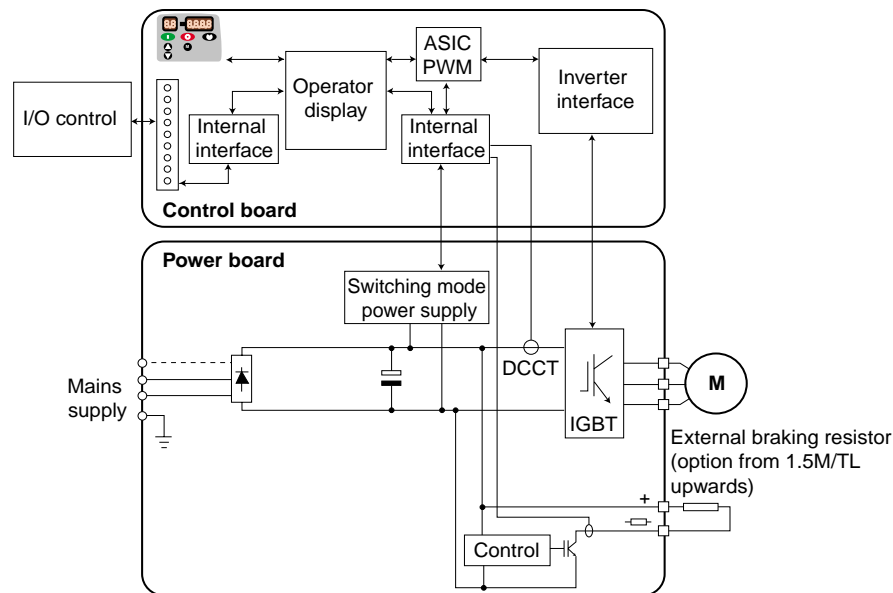
# DIGIDRIVE
# Variable speed drive

## 1.1.3 - Product designation

**DIGIDRIVE  SE  0,5  M**

Type

Rating:  power in kVA

| Single-phase | 200-240V | (M) |
| 3-phase | 200-240V | (TL) |
| Single-phase or 3-phase | 200 - 240V | (M/TL) |
| 3-phase | 400-480V | (T) |

Open loop flux vector drive range

## Example of nameplate:

| SE112025 | SE 0,5M | 0,25 kW |
|---|---|---|
| | 1 ~ L1, L2/N | 3 ~U, V, W | 104F47 |
| V | 200-240V 50-60Hz | 0-240V 0-1000Hz | |
| I | 5,6A | 1,5A | CE |
| Serial No : 3782250029 | | S.W : 01.09.01 Made in U.K. |

## 1.2 - Electrical characteristics

| DIGIDRIVE rating | CT ref. | Input characteristics 200V -10% to 240V +10% 48 - 62 Hz Single-phase | | Output characteristics 0 to U$_{Input}$ 0 to 1000 Hz 3-phase | | | |
|---|---|---|---|---|---|---|---|
| | | | | switching frequency | | | |
| | | | | 3 kHz and 6 kHz | | | 12 kHz |
| | | I$_e$ (A) | I$_e$ peak <10ms (A) | P$_{mot}$ (kW) | I$_{sn}$ (A) | I$_s$ max 60sec (A) | I$_{sn}$ (A) |
| 0.5M | SE11200025 | 5.6 | 100 | 0.25 | 1.5 | 2.3 | 1.5 |
| 1M | SE11200037 | 6.5 | 100 | 0.37 | 2.3 | 3.5 | 2.3 |
| 1.2M | SE11200055 | 8.8 | 100 | 0.55 | 3.1 | 4.7 | 3.1 |
| 1.5M | SE11200075 | 11.4 | 100 | 0.75 | 4.3 | 6.5 | 3.4 |

| DIGIDRIVE rating | CT ref. | Input characteristics 200V -10% to 240V +10% 48 - 62 Hz Single-phase or 3-phase | | | Output characteristics 0 to U$_{Input}$ 0 to 1000 Hz 3-phase | | | |
|---|---|---|---|---|---|---|---|---|
| | | I$_e$ (A) | | I$_e$ peak <10ms (A) | switching frequency | | | |
| | | | | | 3 kHz and 6 kHz | | | 12 kHz |
| | | 1 ph | 3 ph | | P$_{mot}$ (kW) | I$_{sn}$ (A) | I$_s$ max 60sec (A) | I$_{sn}$ (A) |
| 1.5M/TL | SE2D200075 | 11.0 | 5.5 | 55 | 0.75 | 4.3 | 6.5 | 4.0 |
| 2M/TL | SE2D200110 | 15.1 | 7.9 | 55 | 1.1 | 5.8 | 8.7 | 4.2 |
| 2.5M/TL | SE2D200150 | 19.3 | 9.6 | 35 | 1.5 | 7.5 | 11.3 | 7.5 |
| 3.5M/TL | SE2D200220 | 26.2 | 13.1 | 35 | 2.2 | 10.0 | 15 | 10.0 |

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# DIGIDRIVE
## Variable speed drive

| DIGIDRIVE rating | CT ref. | Input characteristics 200V -10% to 240V +10% 48 - 62 Hz 3-phase | | Output characteristics 0 to U$_{Input}$ 0 to 1000 Hz 3-phase | | | |
|---|---|---|---|---|---|---|---|
| | | | | switching frequency | | | |
| | | | | 3 kHz and 6 kHz | | | 12 kHz |
| | | $I_e$ (A) | $I_e$ peak <10ms (A) | $P_{mot}$ (kW) | $I_{sn}$ (A) | $I_s$ max 60sec (A) | $I_{sn}$ (A) |
| 5.5TL | SE23200400 | 21 | 35 | 4 | 17.0 | 25.5 | 13.1 |
| 8TL | SE33200550 | 22.8 | 44 | 5.5 | 25.0 | 37.5 | 25.0 |
| 11TL | SE33200750 | 24.6 | 44 | 7.5 | 28.5 | 42.8 | 26.2 |

| DIGIDRIVE rating | CT ref. | Input characteristics 380V -10% to 480V +10% 48 - 62 Hz 3-phase | | Output characteristics 0 to U$_{Input}$ 0 to 1000 Hz 3-phase | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | switching frequency | | | | |
| | | | | 3 kHz | | | 6 kHz | 12 kHz |
| | | $I_e$ (A) | $I_e$ peak (*) (A) | $P_{mot}$ (kW) | $I_{sn}$ (A) | $I_s$ max 60sec (A) | $I_{sn}$ (A) | $I_{sn}$ (A) |
| 1.5T | SE23400075 | 3.6 | 90 | 0.75 | 2.1 | 3.2 | 2.1 | x |
| 2T | SE23400110 | 4.8 | 90 | 1.1 | 3.0 | 4.5 | 3.0 | 3.0 |
| 2.5T | SE23400150 | 6.4 | 90 | 1.5 | 4.2 | 6.3 | 4.2 | 4.2 |
| 3.5T | SE23400220 | 9.3 | 60 | 2.2 | 5.8 | 8.7 | 5.8 | 5.8 |
| 4.5T | SE23400300 | 11 | 60 | 3 | 7.6 | 11.4 | 7.6 | 6.6 |
| 5.5T | SE23400400 | 14 | 60 | 4 | 9.5 | 14.3 | 9.5 | 6.7 |
| 8T | SE33400550 | 13.0 | 80 | 5.5 | 13.0 | 19.5 | 13.0 | 12.0 |
| 11T | SE33400750 | 15.4 | 80 | 7.5 | 16.5 | 24.8 | 16.5 | 11.9 |
| 16T | SE43401100 | 23 | 40 | 11 | 24.5 | 36.8 | 24.5 | x |
| 22T | SE43401500 | 27.4 | 40 | 15 | 30.5 | 45.8 | 24.5 | x |
| 27T | SE43401850 | 34 | 40 | 18.5 | 37 | 55.5 | 25 | x |
| 33T | SE53402200 | 40 | 28 | 22 | 46 | 69 | 40 | 26.6 |
| 40T | SE53403000 | 52 | 28 | 30 | 60 | 90 | 40 | 26.7 |
| 50T | SE53403700 | 66 | 28 | 37 | 70 | 105 | 46 | 28 |

\* • For 1.5T to 27T ratings: duration of I peak on power-up < 10 ms.
   • For ratings 33T to 50T: duration of I peak on power-up < 50 ms.

**Note:** In factory-set configuration, the switching frequency is 6 kHz. From 22T rating, changing the switching frequency to 3 kHz means that a higher value of $I_{sn}$ can be obtained. To do this, it is necessary to change parameter 37. See section 4 " Commissioning".

# DIGIDRIVE
## Variable speed drive

## 1.3 - Characteristics and main functions

| Characteristics | DIGIDRIVE |
|---|---|
| Regulation mode | Open loop vector control |
| Regulation | Speed reference<br>Torque reference |
| Constant torque<br>Constant power | By adjustment of the base frequency |
| Switching frequency | 3 - 6 - 12 kHz (factory setting: 6 kHz)<br>Automatic reduction of the switching frequency according to the temperature of the IGBTs |
| Overload capacity | 150% $I_{sn}$ for 60s |
| Braking | • Hypersynchronous - Drive only, or with RF option from 1.5M/TL rating upwards<br>• By DC injection |
| Serial link | ANSI - 2 EIA 485 wires, available via the RJ45 connector |
| **Pilot control** | **DIGIDRIVE** |
| Control logic | Positive or Negative |
| Speed references | • Analogue:   - voltage 0 to 10V<br>            - current 0-20mA, 20-0mA, 4-20mA, 20-4mA<br>            4-20mA and 20-4mA with detection of signal break<br>• Digital or keypad<br>• Preset speeds |
| FWD/REV control | • Via logic input<br>• Via the operator display |
| **Operation** | **DIGIDRIVE** |
| Acceleration/deceleration ramp | Separate adjustment from 0 to 3200sec/100Hz |
| Output frequency range adjustment | 0 to 1,000Hz |
| Stop mode | Stop:<br>- freewheel<br>- on ramp<br>- by DC injection |
| Flying restart | Possibility of restarting a motor which is rotating |
| **Preset configuration** | **DIGIDRIVE** |
| Brake control | Enables brake control |
| **Indication** | **DIGIDRIVE** |
| Display | On operator display: output frequency or current |
| Relays | 240V - 2A relay – Resistive load |
| Analogue output | 0 to 10V (maximum current: 5mA) |
| Logic output | 1 assignable output |
| **Options** | **DIGIDRIVE** |
| Resistance braking | RF type |
| RFI filter | FLT type |

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# DIGIDRIVE
## Variable speed drive

| Options | DIGIDRIVE |
|---|---|
| Chokes for attenuating earth leakage currents | MC type |
| Copy key | The FLASHKEY is used to copy or transfer a set of parameters |
| Remote terminal | UNIPAD enables all parameters to be accessed remotely on a 2-line, 16-character display unit |
| Operator interface | Customised display via a fully configurable screen |
| DIGISOFT kit | WINDOWS-based parameter-setting software package consisting of a program and a connection cable with integral RS 232/RS 485 converter supplied by the drive |
| ±10V analogue input | The PM10V option can be used to control the drive via a ±10V bi-directional analogue reference |
| Fieldbus | Interfaces which can be integrated in the drive. Types of fieldbus: - Profibus DP, Device Net, CAN Open, Interbus S. |
| **Serial link** | **DIGIDRIVE** |
| Standard | 2-wire ANSI protocol RS485 communication via RJ45 connector. |

# DIGIDRIVE
## Variable speed drive

## 1.4 - Environmental characteristics
### 1.4.1 - Table

| Characteristics | Level |
|---|---|
| Operating temperature | • **-10°C to 40°C**<br>• Can operate at up to 50°C:<br>  - at 3 kHz: no derating up to 22T.<br>    For 27T to 50T ratings, derate Isn (40°C) by 3% for each additional degree.<br>  - at 6 kHz: derate Isn (40°C) by 2% for each additional degree (5% for 1.5T, 16T and 22T ratings).<br>  - at 12 kHz: derate Isn (40°C) by 5% for each additional degree (3% for 33T to 50T ratings).<br>**CAUTION:**<br>**In order for the drive to comply with UL standards, the operating temperature must not exceed 40°C.** |
| Storage temperature | • -40°C to +60°C, 12 months maximum (see section 6.2 for drive care). |
| Altitude | • ≤ 1000m without derating<br>• Isn derated by 1% for every 100 m above 1000 m (4000 m max) |
| Relative humidity | Up to 95% non condensing |
| Vibration | Tested in accordance with standards IEC 68-2-34, IEC 68-2-36 and |
| Shocks | Tested in accordance with standard IEC 68-2-29 |
| EMC | Immunity: EN50082-2 and EN61800-3<br>• Conforms to EN 50081-1 (for 0.5M to 1.5M ratings), to EN 50081-2 (for 1.5M/TL to 50T ratings) and EN 61800-3 first environment with RFI filter (see section 3.5.4.2).<br>**CAUTION:**<br>**This product conforms to standard IEC 61800-3 for restricted distribution.**<br>**In a residential environment, the drive may produce radio interference; in this case, the user should take the necessary measures.** |
| Index of protection | IP 20 (with cable glands) |
| Maximum number of starts | • Via the control terminal block = unlimited<br>• 20 power-ups per hour (wait 3 min between power-ups) |
| Ventilation | Fan cooling from 2.5M/TL and 2.5T ratings upwards |

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# DIGIDRIVE
## Variable speed drive

### 1.4.2 - Installation in cabinet

Table of losses in Watts at 230V

| DIGIDRIVE rating | Switching frequency | | |
|---|---|---|---|
| | 3 kHz | 6kHz | 12kHz |
| 0.5M | 17 | 18 | 20 |
| 1M | 22 | 24 | 27 |
| 1.2M | 34 | 37 | 42 |
| 1.5M | 50 | 56 | 63 |

| DIGIDRIVE rating | Switching frequency | | |
|---|---|---|---|
| | 3 kHz | 6kHz | 12kHz |
| 1.5M/TL | 48 | 54 | 62 |
| 2M/TL | 63 | 69 | 80 |
| 2.5M/TL | 82 | 88 | 103 |
| 3.5M/TL | 114 | 125 | 146 |

| DIGIDRIVE rating | Switching frequency | | |
|---|---|---|---|
| | 3 kHz | 6kHz | 12kHz |
| 5.5TL | 156 | 174 | 206 |
| 8TL | 210 | 230 | 265 |
| 11TL | 280 | 305 | 335 |

Table of losses in Watts at 480V

| DIGIDRIVE rating | Switching frequency | | |
|---|---|---|---|
| | 3 kHz | 6kHz | 12kHz |
| 1.5T | 35 | 43 | 63 |
| 2T | 44 | 57 | 79 |
| 2.5T | 61 | 77 | 105 |
| 3.5T | 77 | 97 | 130 |
| 4.5T | 95 | 122 | 159 |
| 5.5T | 126 | 158 | 192 |
| 8T | 130 | 190 | 295 |
| 11T | 215 | 270 | 385 |
| 16T | 280 | 400 | 570 |
| 22T | 345 | 495 | 700 |
| 27T | 545 | 660 | 885 |
| 33T | 730 | 870 | 1145 |
| 40T | 950 | 1130 | 1485 |
| 50T | 1090 | 1325 | 1800 |

### 1.4.3 - Table of forced ventilation flow rates

| Forced ventilation | DIGIDRIVE rating | | | | | |
|---|---|---|---|---|---|---|
| | 2.5M/TL and 3.5M/TL | 5.5TL | 2.5T to 5.5T | 8T(L) to 11T(L) | 16T to 27T | 33T to 50T |
| Flow rate (m³/hr) | 72 | 72 | 72 | 95 | 153 | 320 |

# DIGIDRIVE
## Variable speed drive

## 1.5 - Weights and dimensions

### 1.5.1 - 0.5M to 27T ratings
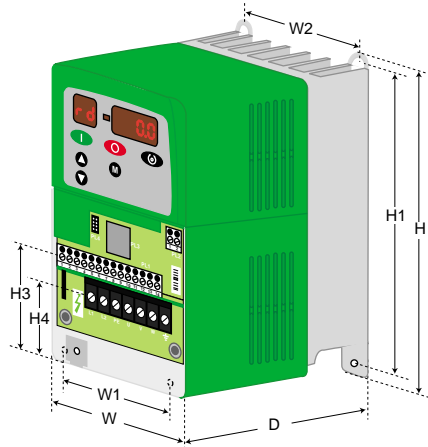


| DIGIDRIVE rating | Dimensions (mm) | | | | | | | | Weight (kg) | Screws |
|---|---|---|---|---|---|---|---|---|---|---|
| | **W** | **W1** | **W2** | **H** | **H1** | **H3** | **H4** | **D** | | |
| 0.5M and 1M | 102 | 84 | 84 | 191 | 181.5 | 57 | 40 | 130 | 1.1 | 4xM4 |
| 1.2M and 1.5M | 102 | 84 | 84 | 191 | 181.5 | 57 | 40 | 130 | 1.25 | 4xM4 |
| 1.5M/TL to 5.5T(L) | 147 | 121.5 | 122 | 280 | 265 | 140 | 42 | 130 | 2.7 | 4xM4 |
| 8T(L) and 11T(L) | 190 | 172 | 164 | 336 | 320 | 190 | 45 | 155 | 6 | 4xM4 |
| 16T to 27T | 250 | 228 | 217 | 412 | 397 | 243 | 55 | 185 | 11 | 4xM5 |

### 1.5.2 - 33T to 50T ratings
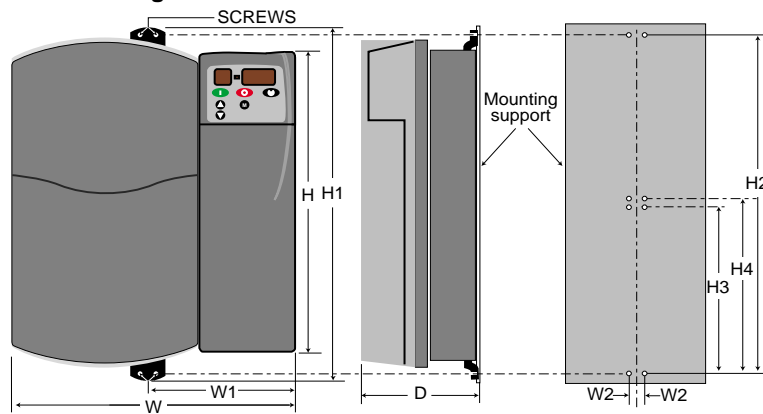


| DIGIDRIVE rating | Dimensions (mm) | | | | | | | | | Weight (Kg) | Screws |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **W** | **W1** | **W2** | **H** | **H1** | **H2** | **H3** | **H4** | **D** | | |
| 33T to 50T | 375 | 187.5 | 16.5 | 335 | 368 | 346 | 175 | 220 | 260 | 22 | M6 |

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# DIGIDRIVE
## Variable speed drive

### 1.5.2.1 - Mounting with cooling unit inside the cabinet

The drives can be installed on a solid base plate, a grille, a chassis or a DIN rail, so that the cooling air flow can be channelled around the drive.
- Insert the mounting feet in the grooves at the top and bottom of the cooling unit.
- Fix the feet on the base plate, the DIN rail, or on the grille using M6 screws.

### 1.5.2.2 - Mounting with cooling unit outside the cabinet

1 - Cut out and drill holes in the cabinet rear panel.
2 - Insert a mounting foot in the groove at the top of the drive.
3 - Remove the bottom terminal block access flap in order to get at the fixing holes.
4 - Place the weatherproof seal supplied with the drive on the flange.
5 - Insert the drive in the rear panel cut-out.
6 - Fix the drive by means of the fixing at the top and the holes at the bottom.

**CAUTION:**

**Check that there is adequate air circulation at the back of the cabinet.**
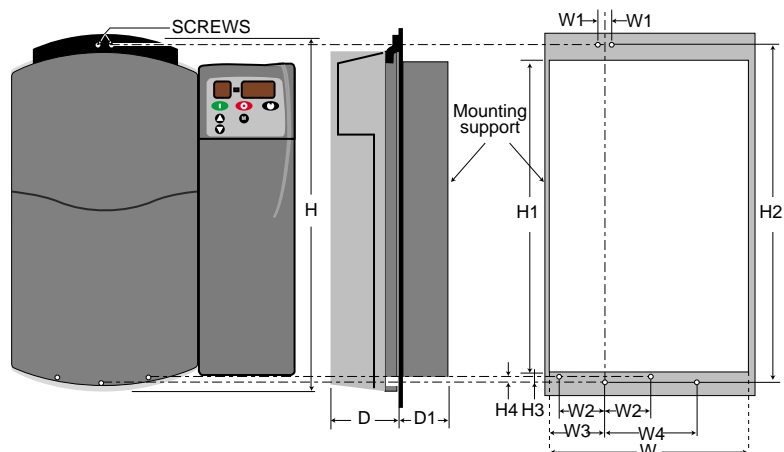


| DIGIDRIVE | Dimensions (mm) | | | | | | | | | | | Weight | Screws |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| rating | W | W1 | W2 | W3 | W4 | H | H1 | H2 | H3 | H4 | D | P1 | (Kg) | |
| 33T to 50T | 358 | 16.5 | 69 | 131.5 | 187 | 364 | 287 | 346 | 16 | 7 | 120 | 140 | 22 | M6 |

## 2 - MECHANICAL INSTALLATION

**• It is the responsibility of the owner or the user to ensure that the installation, operation and maintenance of the drive and its options comply with legislation relating to the safety of equipment and personnel, and with the current regulations of the country of use.**

**• The DIGIDRIVE must be installed in an environment free from conducting dust, corrosive fumes, gases and fluids, and condensation (for example class 2 according to UL 840 and IEC 664.1). The drive must not be installed in hazardous areas unless it is in an appropriate enclosure. In this case the installation must be approved.**

**• In atmospheres where condensation may form, install a heating system which operates when the drive is not in use and is switched off when the drive is in use. It is advisable to control the heating system automatically.**

**• The DIGIDRIVE casing is not fireproof. If necessary, use a flameproof cabinet.**

### 2.1 - Checks on receipt

Before installing the drive, check that:
- The drive has not been damaged during transport.
- The control terminal blocks and the cable glands have been supplied with the drive (plastic wallet under the protective cover, containing: 3 cable glands for the power cables and the motor cables + 1 cable gland for the control cables + 1 terminal block with 14 terminals + 1 terminal block with 2 terminals).
- The nameplate corresponds to the mains supply and the motor.

### 2.2 - Installation recommendations

• Mount the drive vertically providing a space:
- of more than 100 mm between 2 rows (150 mm for 33T to 50T ratings)
- of more than 20 mm between 2 drives
- of more than 10 mm between the drive and the cabinet.
• Do not place the DIGIDRIVE above a heat source.

### 2.3 - Mounting

The DIGIDRIVE is fixed using 4 screws, in accordance with the diagram below.
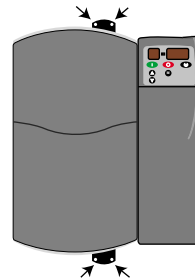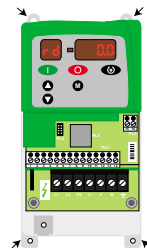


### 2.4 - UL conformity

To ensure conformity with UL standards, install the drive in a separate electrical enclosure, which should be UL approved.

## 3 - CONNECTIONS

⚠ **• All connection work must be performed in accordance with the laws in force in the country in which the drive is installed. This includes earthing to ensure that no directly accessible part of the drive can be at the mains voltage or any other voltage which may be dangerous.**

**• The voltages on the cables or connections of the mains supply, the motor, the braking resistor or the filter may cause fatal electric shocks. Contact must be avoided in all circumstances.**

**• The drive must be supplied via a circuit-breaking device so that it can be powered down safely.**

**• The drive power supply must be protected against overloads and short-circuits.**

**• The drive stop function does not protect against high voltages on the terminal blocks.**

**• The drive contains capacitors which remain charged at a fatal voltage even after the power supply has been switched off. Wait 10 min after powering down the drive before removing the protective cover.**

**• Check that the voltage and current of the drive, the motor and the mains supply are compatible.**

**• To ensure that the drive conforms to UL standards, use only class 1 copper wires, 60/75°C.**

## 3.1 - Access to the terminal blocks

Removing the cover:

1) Using a screwdriver, loosen the screw(s) at the base of the drive until you can lift up the cover.
2) Lift up the base of the cover completely.
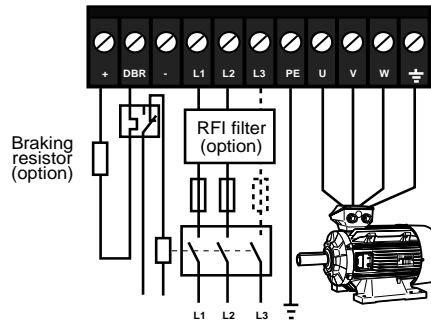3) Pull the cover to the side and backwards (see diagram below).
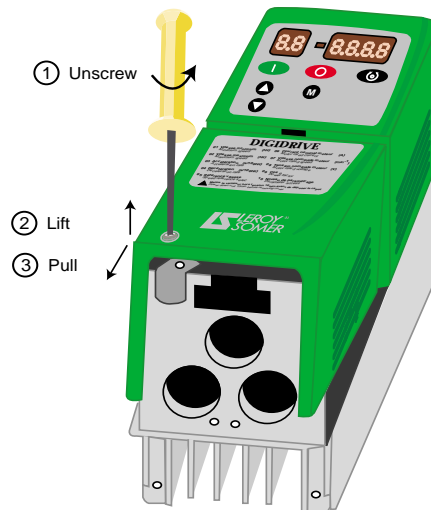


⚠ **• The cover must be replaced after the terminal blocks have been connected.**

## 3.2 - Terminal block layout



Copy key
Relay
Serial link
Control terminal block
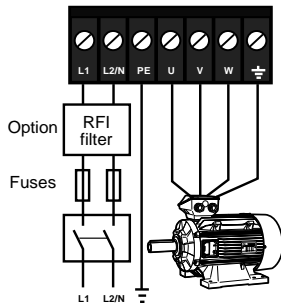Power terminal block
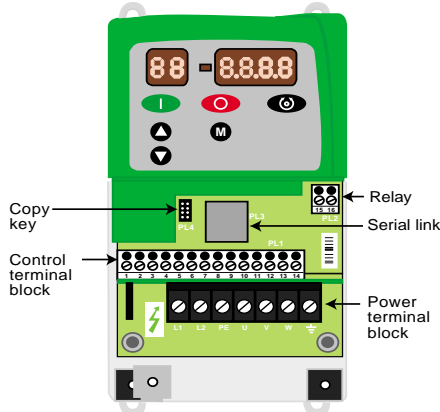
## 3.3 - Description of the terminal blocks

### 3.3.1 - Power terminal block

The maximum tightening torque for the power terminals is 1N.m for 0.5M to 5.5T(L) ratings, 2N.m for 8T(L) to 27T ratings, and 15N.m for 33T to 50T ratings.
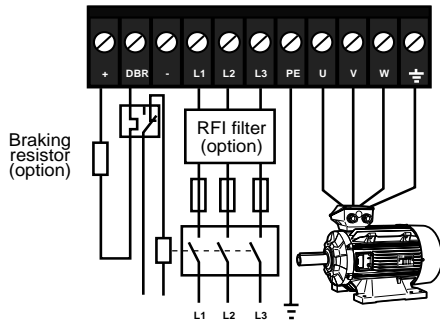
• 0.5M to 1.5M ratings



Option
RFI filter
Fuses

| Terminals | Functions |
|---|---|
| L1, L2/N | Single-phase power supply 200 to 240V ±10% 50-60 Hz ±2% |
| PE | Connection to mains supply earth |
| U, V, W | Motor connection (respect the motor/drive phase order) |
| ⏚ | Motor connection to earth |

• 1.5M/TL to 3.5M/TL ratings



Braking resistor (option)
RFI filter (option)

| Terminals | Functions |
|---|---|
| L1, L2 L1, L2, L3 | Single-phase power supply 3-phase power supply 200 to 240V ±10% 50-60 Hz ±2% |
| PE | Connection to mains supply earth |
| U, V, W | Motor connection (respect the motor/drive phase order) |
| ⏚ | Motor connection to earth |
| + DBR | Connection of the optional RF braking resistors (via a thermal relay) between the + on the DC bus and terminal DBR |
| - | DC bus - |

⚠️ **• Check that the braking resistors are correctly connected between the + and DBR terminals (and not + and -).**
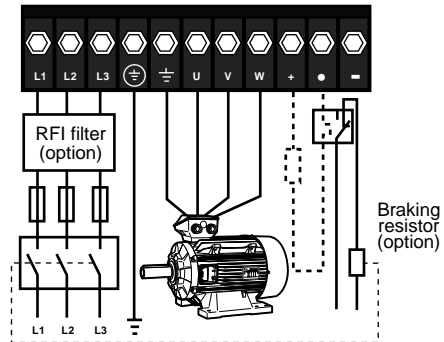
# DIGIDRIVE
## Variable speed drive

• 5.5TL to 11TL and 1.5T to 27T ratings



Braking resistor (option)

RFI filter (option)

L1 L2 L3

| Terminals | Functions |
|-----------|-----------|
| L1, L2, L3 | 3-phase power supply 200 to 240V ±10% (5.5TL to 11TL) or 380 to 480V ±10% (1.5T to 27T) 50-60 Hz ±2% |
| PE | Connection to mains supply earth |
| U, V, W | Motor connection (respect the motor/drive phase order) |
| ⊥ | Motor connection to earth |
| + DBR | Connection of the optional RF braking resistors (via a thermal relay) between the + on the DC bus and terminal DBR. |
| - | DC bus - |

⚠ **• Check that the braking resistors are correctly connected between the + and DBR terminals (and not + and -).**

• 33T to 50T ratings



RFI filter (option)

Braking resistor (option)

L1 L2 L3

| Terminals | Functions |
|-----------|-----------|
| L1, L2, L3 | 3-phase power supply 380 to 480V ±10% 50-60 Hz ±2% |
| ⊕ | Connection to mains supply earth |
| U, V, W | Motor connection (respect the motor/drive phase order) |
| ⊥ | Motor connection to earth |
| + • | Connection of the optional RF braking resistors (via a thermal relay between the DC bus + and the • terminal. |
| - | DC bus - |

⚠ **• Check that the braking resistors are correctly connected between the + and • terminals (and not + and -).**

# DIGIDRIVE
## Variable speed drive

### 3.3.2 - Control terminal blocks

⚠ **• The DIGIDRIVE is factory set with a positive logic configuration.**
**• All the terminal block explanations are given for positive logic.**
**• Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.**

PL2

PL1
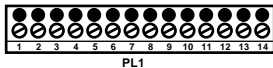
The maximum tightening torque for the control terminals is 0.6 N.m.

| 1 | 0V common |
|---|---|

| 2 | Analogue voltage input (A1) | |
|---|---|---|
| Voltage range | 0 to +10V |
| Scale | 0V corresponds to minimum speed (①①) 10V corresponds to the maximum speed value (①②) |
| Absolute maximum voltage range | -18 to +35V in relation to the 0V common |
| Input impedance | 100 kΩ |
| Resolution | 0.1% (10 bits) |
| Accuracy | ± 2% |
| Sampling time | 6 ms |

| 3 | +10V potentiometer power supply | |
|---|---|---|
| Voltage accuracy | ± 2% |
| Maximum output current | 5mA |
| Protection | Designed to tolerate a permanent short-circuit at the 0V |

| 4 | 0V common |
|---|---|

| 5 | Analogue current input (A2) | |
|---|---|---|
| Current range | 0-20mA, 20-0mA, 4-20mA and 20-4mA with or without detection of signal break. |
| Absolute maximum voltage range | -18V to +30V in relation to the 0V common |
| Input impedance | 200 Ω |
| Resolution | 0.1% (10 bits) |
| Accuracy | ± 2% |
| Sampling time | 6 ms |
| **Factory setting** | **4-20mA without detection of signal break** |

| 6 | Analogue output | |
|---|---|---|
| Voltage range | 0 to +10V |
| Absolute maximum voltage range | -1V to +35V in relation to the 0V common |
| Scale | Motor frequency image output: • 10V corresponds to the maximum frequency ①② or Motor load image output: • 10V corresponds to 150% of the current at full load: Output voltage = $\dfrac{\text{I active}}{1.5 \times \text{I nom var.}} \times 10$ |
| Maximum current output | 5mA |
| Resolution | 0.1% (10 bits) |
| Accuracy | ± 5% |
| Update time | 22 ms |
| Protection | Designed to tolerate a permanent short-circuit at the 0V |
| **Factory setting** | **Motor frequency** |

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# DIGIDRIVE
## Variable speed drive

| 7 14 | +24V source | |
|---|---|---|
| Voltage accuracy | ± 10% |
| Maximum output current | 100mA |
| Protection | Designed to tolerate a permanent short-circuit at the 0V common |

| 8 | Logic output | |
|---|---|---|
| Voltage range | 0 to +24V |
| Absolute maximum voltage range | -1V to +35V in relation to the 0V common |
| Maximum output current | 50mA (at +24V) |
| Output impedance | 10 kΩ |
| Update time | 1.5 ms |
| **Factory setting** | **Zero frequency** |

| 9 | **Logic input: Unlock** |
|---|---|
| 10 | **Logic input: Forward** |
| 11 | **Logic input: Reverse** |
| 12 | **Logic input:  Reference selection** |
| 13 | **Logic input: Jogging or reference selection** |

| | |
|---|---|
| Voltage range | 0 to +24V |
| Absolute maximum voltage range | -18V to +35V in relation to the 0V common |
| Rated threshold voltage | +10V |
| Input impedance | 7.5 kΩ |
| Sampling time | 1.5 ms |
| **Logic levels in positive logic (factory setting)** | **Level 0: < +9.5V (open circuit) Level 1: > +10.5V (closed circuit)** |
| Logic levels in negative logic (see section 4.4) | Level 0: > +10.5V (open circuit) Level 1: < +9.5V (closed circuit) |

| 15 16 | Relays | |
|---|---|---|
| Voltage/Current | 240V~/2A 30VDC/6A |
| Contact insulation | 2.5kVAC |
| Update time | 6 ms |
| **Contact operation:** | **Open: off or faulty Closed: drive operational** |

**CAUTION:**
**The +24V source can supply a total current of 100 mA, including the logic output (terminal 8).**
**For example: if the consumption of the logic output is 30 mA, the +24V source will only be able to supply 70mA.**

# DIGIDRIVE
## Variable speed drive

### 3.4 - Description of cables and protective devices

#### 3.4.1 - General characteristics

⚠ • **It is the responsibility of the user to connect the DIGIDRIVE and fit protective devices in accordance with the legislation and regulations in force in the country of use. This is particularly important as regards the size of the cables, the type and size of fuses, the earth or ground connection, powering down, acknowledging faults, insulation and protection against overcurrents.**

• **The following table is given for information only, and must under no circumstances be used in place of the current standards.**

| DIGIDRIVE rating | Examples of cable cross-sections (mm²) * | | | | | Input protective fuses (gG) (A) | | Maximum length of motor cables (m) |
|---|---|---|---|---|---|---|---|---|
| | Motor | Mains | | Braking resistor | Remote control (shielded) | 1 ph | 3 ph | |
| | | 1 ph | 3 ph | | | | | |
| 0.5M | 1.5 | 1.5 | - | - | ≥ 0.5 | 6 | - | 75 |
| 1M | 1.5 | 1.5 | - | - | ≥ 0.5 | 10 | - | |
| 1.2M | 1.5 | 1.5 | - | - | ≥ 0.5 | 16 | - | |
| 1.5M | 1.5 | 1.5 | - | - | ≥ 0.5 | 16 | - | |
| 1.5M/TL | 1.5 | 1.5 | 1.5 | 1.5 | ≥ 0.5 | 16 | 10 | 100 |
| 2M/TL | 1.5 | 2.5 | 1.5 | 1.5 | ≥ 0.5 | 20 | 16 | |
| 2.5M/TL | 1.5 | 2.5 | 1.5 | 1.5 | ≥ 0.5 | 25 | 16 | |
| 3.5M/TL | 1.5 | 4.0 | 1.5 | 1.5 | ≥ 0.5 | 32 | 20 | |
| 5.5TL | 2.5 | | 4.0 | 2.5 | ≥ 0.5 | - | 32 | |
| 8TL | 4.0 | - | 4.0 | 4.0 | ≥ 0.5 | - | 32 | 150 |
| 11TL | 4.0 | - | 4.0 | 4.0 | ≥ 0.5 | - | 32 | |
| 1.5T | 1.5 | - | 1.5 | 1.5 | ≥ 0.5 | - | 10 | 100 |
| 2T | 1.5 | - | 1.5 | 1.5 | ≥ 0.5 | - | 10 | |
| 2.5T | 1.5 | - | 1.5 | 1.5 | ≥ 0.5 | - | 10 | |
| 3.5T | 1.5 | - | 1.5 | 1.5 | ≥ 0.5 | - | 16 | |
| 4.5T | 1.5 | - | 1.5 | 1.5 | ≥ 0.5 | - | 16 | |
| 5.5T | 1.5 | - | 2.5 | 1.5 | ≥ 0.5 | - | 16 | |
| 8T | 2.5 | - | 2.5 | 2.5 | ≥ 0.5 | - | 16 | 150 |
| 11T | 2.5 | - | 2.5 | 2.5 | ≥ 0.5 | - | 20 | |
| 16T | 4.0 | - | 4.0 | 6.0 | ≥ 0.5 | - | 32 | |
| 22T | 6.0 | - | 6.0 | 6.0 | ≥ 0.5 | - | 40 | |
| 27T | 10 | - | 10 | 10 | ≥ 0.5 | - | 50 | |
| 33T | 10 | - | 10 | 10 | ≥ 0.5 | - | 63 | 60 |
| 40T | 16 | - | 16 | 16 | ≥ 0.5 | - | 80 | |
| 50T | 16 | - | 16 | 16 | ≥ 0.5 | - | 100 | |

\* The recommended cross-sections are given for a single-wire cable whose maximum length is 10 metres. Above this, the line drops due to the length must be taken into account.

**Note:**

• The temperature withstand of the cables used for the control and power cables must be at least 105°C.

• The protective fuses must conform to EN 60269 parts 1 and 2.

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**CAUTION:**
**• The use of high-capacity cables reduces by half the maximum length shown in the table on the previous page.**
**• The maximum length of the motor cables may differ from that shown in the table on the previous page. In fact, the maximum length of the motor cables varies in inverse proportion to the switching frequency variation. Since the lengths in the table are given for a switching frequency of 6 kHz, the length of other switching frequencies can be deduced from this. Examples:**
**- maximum length of motor cables at 3 kHz = maximum length at 6 kHz multiplied by 2**
**- maximum length of motor cables at 12 kHz = maximum length at 6 kHz divided by 2**
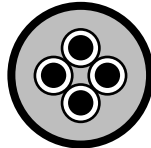
Normal
capacity
cable

High
capacity
cable

### 3.4.2 - Conformity to UL standards

The drive must be incorporated in an installation which can deliver 5000 rms symmetrical Amps maximum at a voltage of 264VAC rms maximum for type "M" or "TL" 230V drives or 528VAC rms maximum for type "T" 400V drives.

The drive has integral motor overload protection (150% of the full load current). For this protection to work correctly, it is necessary to set parameter $06$ to "motor rated current".

To ensure the drive conforms to UL standards, use UL standard quick-blowing fuses according to the table below.

| DIGIDRIVE rating | Fuse type |
|---|---|
| 0.5M to 1.5M | Class CC quick-blowing fuses<br>eg: Limitron KTK by Bussman, Amp-trap ATM by Gould (or equivalent) |
| 1.5M/TL to 5.5TL<br><br>1.5T to 5.5T | Class CC quick-blowing fuses<br>eg: Limitron KTK by Bussman, Amp-trap ATM by Gould (or equivalent) except in the following cases:<br>• 3.5M/TL used in single-phase: class J 35A quick-blowing fuses<br>  eg: JLS35 Littelfuse Power Gard<br>• 5.5TL: class CC 30A quick-blowing fuses<br>• 3.5M/TL used in single-phase, and 5.5TL: the power supply wiring for the power must be made up with UL approved cables type 12 AWG (terminal width 8.0 mm maximum) to standard UL 486 A/C |
| 8TL and 11TL | Class J 35A quick-blowing fuses<br>eg: A4J35 Amp-Trap by Gould, JLS35 Littelfuse Power Gard (or equivalent) |
| 8T and 11T | Class CC quick-blowing fuses<br>eg: Limitron KTK by Bussman, Amp-Trap ATM by Gould (or equivalent) |
| 16T and 27T | Class J 40A quick-blowing fuses<br>eg: A4J40 Amp-Trap by Gould, JLS40 Littelfuse Power Gard (or equivalent) |
| 33T to 50T | Class RK1 600VAC fuses |

**Notes**

# DIGIDRIVE
# Variable speed drive

## 3.5 - Electrical and electromagnetic phenomena

### 3.5.1 - General

The power structure of variable speed drives leads to the occurrence of two types of phenomenon:
- low frequency harmonic feedback on the mains power supply
- emission of radio frequency signals (RFI)
**These are independent phenomena. They have different consequences on the electrical environment.**

### 3.5.2 - Low frequency harmonics

The rectifier, at the head of the variable speed drive, draws on the capacitors and generates a non-sinusoidal AC line current. This current carries harmonics with odd numbers (3, 5, 7 etc for single-phase drives and 5, 7, 11, 13 etc for three-phase drives). The amplitude of these harmonics depends on the impedances upstream of the rectifier (line impedance plus any additional chokes) and downstream of the rectifier (DC bus choke inside the drive, if fitted). The higher the value of these impedances, the more the amplitude of the current harmonics is reduced.

The addition of further line chokes reduces the amplitude of the mains supply current harmonics (especially for drives not fitted with a DC bus choke), but also attenuates transient interference between the mains and the drive.

These line chokes are compulsory for 0.5M to 1.2M ratings, for conformity with standard EN 61000-3-2 "Limiting emissions of harmonic currents" in the domestic environment, and are strongly recommended for other ratings in the following cases:
- mains power supply transformer power above 200 kVA
- line short-circuit current above 5 kVA
- bank of capacitors for reading the power factor connected on the mains
- drives with high-power thyristors supplied by the same mains supply (especially if they are not fitted with line chokes)

- D.O.L. induction motors on the mains supply causing transient voltage drops of more than 20%.

| DIGIDRIVE ratings | Mains | Mains chokes |
|---|---|---|
| 0.5M to 1.2M | 1-ph | (16mH/4.5A) Consult LEROY-SOMER |
| 1.5M, 1.5M/TL and 2M/TL | 1-ph | (1mH/7.3A) Consult LEROY-SOMER |
| 2.5M/TL and 3.5M/TL | 1-ph | (0.5mH/19A) Consult LEROY-SOMER |
| 1.5M/TL to 2.5M/ and 1.5T to 3.5T | 3-ph | 9 ST 2.5 (2.5mH/9A) |
| 3.5M/TL and 4.5T to 11T | 3-ph | 16 ST 1.5 (1.5mH/16A) |
| 5.5TL to 11TL and 16T and 22T | 3-ph | 25 ST 1 (1mH/25A) |
| 27T | 3-ph | 38 ST 0.65 (38A / 0.65mH) |
| 33T and 40T | 3-ph | 60 ST 0.4 (60A / 0.4mH) |
| 50T | 3-ph | 90 ST 0.28 (90A / 0.65mH) |

### 3.5.3 - Radio frequency interference: Immunity

#### 3.5.3.1 - General
The immunity level of a device is defined by its ability to operate in an environment which is polluted by external elements or by its electrical connections.

#### 3.5.3.2 - Standards
Each device must undergo a series of standard tests (European standards) and meet a minimum requirement in order to be declared as compliant with the generic industrial (EN 50082-2) and domestic (EN 50082-1) standards.

# DIGIDRIVE
## Variable speed drive

**3.5.3.3 - Recommendations**
**An installation consisting exclusively of devices which comply with the standards concerning immunity is very unlikely to be subject to a risk of interference.**

**3.5.4 - Radio frequency interference: Emission**

**3.5.4.1 - General**
Variable speed drives use high-speed switches (transistors, semi-conductors) which switch high voltages (around 550V for 3-phase drives) and currents at high frequencies (several kHz). This provides better efficiency and a low level of motor noise.

As a result, they generate radio frequency signals which may disturb operation of other equipment or distort measurements taken by sensors:

- due to high-frequency leakage currents which escape to earth via the stray capacity of the drive/motor cable and that of the motor via the metal structures which support the motor

- by conduction or feedback of R.F. signals on the power supply cable: **conducted emissions**

- by direct radiation near to the mains supply power cable or the drive/motor cable: **radiated emissions**

These phenomena are of direct interest to the user.

The frequency range concerned (radio frequency) does not affect the energy distribution company.

**3.5.4.2 - Standards**
The maximum emission level is set by the generic industrial (EN 50081-2) and domestic (EN 50081-1) standards.

**3.5.4.3 - Recommendations**
**• Experience shows that the levels set by standards EN 50081-1 and 50081-2 do not necessarily need to be respected to eliminate interference phenomena.**
**• Following the basic precautions in the next paragraph generally results in correct operation of the installation.**

**3.5.5 - Basic precautions**
These are to be taken at the design stage and also when wiring the cabinet and the external elements. In each paragraph, they are listed in decreasing order of effect on correct operation of the installation.

**3.5.5.1 - Design**
1) Choice of equipment
Give priority to components whose level of immunity conforms to the generic immunity standards EN 50082-1 and EN 50082-2, and mount them in a steel cabinet.
2) Location of the drive
Install the drive as close as possible to the motor to reduce the length of the cable.

**3.5.5.2 - Installation of the drive and associated components in the cabinet**
1) Screw the drive and the components on to a metal grille or a base plate which is unpainted or paint-free at the fixing points.
2) Fix the plate at several paint-free points at the back of the cabinet.

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## Variable speed drive

### 3.5.5.3 - Wiring inside the cabinet
1) Do not run the control cables and the power cables in the same cable ducts.
2) For control cables, use a shielded twisted cable with tight copper shielding mesh and connect the shielding to the 0V at the drive end only.
3) Fit an RC filter to relays and contactors which are near the drive or are electrically connected to the drive.

### 3.5.5.4 - Wiring outside the cabinet
1) Isolate the power cables from the control cables.
2) Connect the motor earth terminal directly to that of the drive.
3) Run the motor power supply cables and the auxiliary cable, which links the motor earth to that of the drive, in a metal cable duct. This cable duct should be mechanically connected to the cabinet and the metal structure supporting the motor. Fix the conductors securely at the bottom of the duct.
4) Do not route the control cables (drive and feedback) along metal structures which may be shared by the motor support.
5) Isolate sensitive elements (probes, sensors, etc) from metal structures which may be shared by the motor support.

### 3.5.5.5 - Importance of ground wiring
The immunity and radio frequency emission level are directly linked to the quality of the ground connections. Metal grounds should be mechanically connected to each other with the largest possible electrical contact area.

Under no circumstances can the earth grounds, which are designed to protect personnel by linking metal grounds to earth via a cable, serve as a substitute for the ground connections.

### 3.5.6 - IT mains supply

On IT mains supplies, the phase potential and the earth potential are not closely associated. The drive power supply may therefore be subjected to significant transient interference in the voltage, between phases and/or between phase and neutral.
To avoid drive malfunctions in this situation, it is advisable to place chokes in series in the drive power supply which oppose the transient interference with a high impedance, significantly reducing the amplitude of this interference.
For choke selection, see the table of mains chokes in section 3.5.2.

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## Variable speed drive

### 3.5.7 - Additional precautions

Following the basic precautions in the previous paragraph generally results in correct operation of the installation. However, even greater immunity can be achieved by taking the following additional precautions. These are listed in order of importance.

### 3.5.7.1 - Insertion and wiring of an MC choke

Most interference phenomena are caused by high-frequency leakage currents escaping to earth via the drive/motor cable and via the metal structures supporting the motor.

MC chokes can be used to reduce these leakage currents. Their role is even more important when the drive/motor cable is very long.

Use MC chokes with a standard cable no more than 100 m long.

Place the MC choke as near the drive as possible.

| Drive ratings | MC choke |
|---|---|
| 0.5M to 1.5M<br>1.5M/TL and 2M/TL<br>1.5T to 3.5T | 3.5T |
| 2.5M/TL and 3.5M/<br>4.5T to 11T | 11T |
| 5.5TL to 11TL<br>16T to 27T | 27T |
| 33T to 50T | 50T |

### 3.5.7.2 - RFI filter

The RFI filter contributes to a reduction in the emission levels of the radio frequency signals on the power supply cable, but its role in handling interference phenomena is fairly limited. Depending on the drive used, install the RFI filter recommended in the table below between the mains and the drive input.

| DIGIDRIVE ratings | Type 1 filters | | Type 2 filters | |
|---|---|---|---|---|
| | Length of motor cables (m) | Reference | Length of motor cables (m) | Reference |
| 0.5M to 1.5M | 1 to 20 | FLT 5594 - 12 | 1 to 75 | FLT 5581 - 12 |
| 1.5M/TL to 3.5M/TL (1-ph) | 1 to 50 | FLT 5594 - 26 | 1 to 100 | FLT 5581 - 26 |
| 1.5M/TL to 3.5M/TL (3-ph) | 1 to 15 | FLT 5901 - 17 | 1 to 100 | FLT 5569 - 16 |
| 5.5TL | 1 to 15 | FLT 5901 - 30 | 1 to 100 | FLT 5569 - 26 |
| 1.5T to 5.5TL | 1 to 15 | FLT 5901 - 17 | 1 to 100 | FLT 5569 - 16 |
| 8TL and 11TL | 1 to 15 | FLT 5901 - 30 | 1 to 100 | FLT 5569 - 30 |
| 8T and 11T | 1 to 15 | FLT 5901 - 17 | 1 to 100 | FLT 5569 - 17 |
| 16T and 22T | 1 to 15 | FLT 5901 - 33 | 1 to 100 | FLT 5569 - 33 |
| 27T | 1 to 20 | FLT 5901 - 37 | 1 to 100 | FLT 5569 - 37 |
| 33T | - | - | 1 to 100 | FLT 5113 - 50 |
| 40T | - | - | 1 to 100 | FLT 5113 - 63 |
| 50T | - | - | 1 to 100 | FLT 5113 - 100 |

• Precautions when mounting the filter
- Place the filter as near the drive as possible.
- Mount the type 1 filter directly on the same grille or same base plate as the drive.
- Mount the type 2 filter at the back or on the side of the drive.
• Precautions when wiring the filter
- The maximum length of the cable to the drive should be 0.3 m.
- Separate mains cables from motor cables.
- Wire up the earth: input to the cabinet general earth, output to the drive earth.

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### 3.5.7.3 - Drive-motor wiring

Use a shielded cable between the drive and the motor.

• Cable characteristics

Use a 3-phase + earth shielded or armoured cable with low stray capacity between the cables and the shielding or sheathing.

• Connecting the shielding

- Connect the shielding at both ends: to the earth terminal on both the motor and the drive (or to the fieldbus at the filter output).

- Strip back the cable covering and fix the shielding securely to the cabinet grille or base plate using a metal jumper.

- If possible, connect the shielding to the cabinet ground at the cable exit point, using brass cable glands for example, and stripping back the cable covering.

• Tip to ensure shielding continuity

- When the motor is connected via the intermediate terminal block in the cabinet, connect the shielding using a terminal which is not isolated from the grille or base plate. If the terminal block is located more than 300 mm from the edge of the grille, fix the shielding securely using a metal jumper.

- When a switching device is used close to the motor, use a grounding strip (maximum length 100 mm) to provide continuity.

### 3.5.8 - Conformity to standards
Tests carried out in conditions imposed by the standards demonstrate that, providing they are installed and connected in accordance with the instructions in paragraphs 3.5.5 and 3.5.7, DIGIDRIVE units conform to the EMC directive 89/336/EEC modified by 92/31/EEC.

### 3.5.8.1 - Immunity
DIGIDRIVE units conform to international immunity standards.

| Standards | Type of immunity | Application | Level |
|---|---|---|---|
| EN 50082-1 | Generic immunity standard Part 1: residential, commercial and light industry | - | Conforms |
| EN 50082-2 | Generic immunity standard Part 2: industrial environment | - | Conforms |
| EN 61800-3 IEC 61800-3 | Variable speed drive standard | Conforms to the first and second environment | |

### 3.5.8.2 - Conducted emissions
When used with the associated filters, DIGIDRIVE units conform to the standards relating to conducted emissions in the conditions indicated below.

| Symbols | Standards | Description | Application |
|---|---|---|---|
| R | EN 50081-1 | Generic emission standard for residential, commercial and light industry environments | A.C. supply |
| | EN 61800-3 IEC 61800-3 | Variable speed drive standard | Conforms to the first and second environments |
| I | EN 50081-2 | Generic emission standard for industrial environments | A.C. supply |
| | EN 61800-3 IEC 61800-3 | Variable speed drive standard | Conforms to the first and second environments |
| # | Requires special technology: please consult LEROY-SOMER | | |

**Conducted emissions with Type 1 filter (for filter characteristics see section 7.1)**

| Ratings | Voltage | Filters | Length of motor cables (m) | Switching frequency | | |
|---|---|---|---|---|---|---|
| | | | | 3 kHz | 6 kHz | 12 kHz |
| 0.5M to 1.5M | 1-ph 230V | FLT 5594 - 12 | 1 to 20 | R | R | I |
| 1.5M/TL to 3.5M/TL | 1-ph 230V | FLT 5594 - 26 | 1 to 15 | I | I | I |
| | | | 15 to 50 | I | # | # |
| 1.5M/TL to 3.5M/TL | 3-ph 230V | FLT 5901 - 17 | 1 to 15 | I | # | # |
| 5.5TL | 3-ph 230V | FLT 5901 - 30 | 1 to 20 | I | I | I |
| 1.5T to 5.5T | 3-ph 400V | FLT 5901 - 17 | 1 to 15 | I | # | # |
| 8TL and 11TL | 3-ph 230V | FLT 5901 - 30 | 1 to 15 | I | I | # |
| 8T and 11T | 3-ph 400V | FLT 5901 - 17 | 1 to 15 | I | I | I |
| 16T and 22T | 3-ph 400V | FLT 5901 - 33 | 1 to 15 | I | # | # |
| 27T | 3-ph 400V | FLT 5901 - 37 | 1 to 20 | I | # | # |

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**Conducted emissions with Type 2 filter (for filter characteristics see section 7.2)**

| Ratings | Voltage | Filters | Length of motor cables (m) | Switching frequency | | |
|---|---|---|---|---|---|---|
| | | | | 3 kHz | 6 kHz | 12 kHz |
| 0.5M to 1.5M | 1-ph 230V | FLT 5581 - 12 | 1 to 5 | R | R | R |
| | | | 5 to 20 | R | R | I |
| | | | 20 to 50 | R | I | I |
| | | | 50 to 75 | I | # | # |
| 1.5M/TL to 3.5M/TL | 1-ph 230V | FLT 5581 - 26 | 1 to 15 | R | R | R |
| | | | 15 to 80 | R | R | I |
| | | | 80 to 100 | I | I | I |
| 1.5M/TL to 3.5M/TL | 3-ph 230V | FLT 5569 - 16 | 1 to 45 | R | R | R |
| | | | 45 to 100 | R | R | I |
| 5.5TL | 3-ph 230V | FLT 5569 - 26 | 1 to 20 | R | R | I |
| | | | 20 to 45 | I | I | I |
| | | | 45 to 100 | I | # | # |
| 1.5T to 5.5T | 3-ph 400V | FLT 5569 - 16 | 1 to 20 | R | R | I |
| | | | 20 to 50 | R | I | I |
| | | | 50 to 100 | I | # | # |
| 8TL and 11TL | 3-ph 230V | FLT 5569 - 30 | 1 to 20 | R | I | I |
| | | | 20 to 100 | I | # | # |
| 8T and 11T | 3-ph 400V | FLT 5569 - 17 | 1 to 15 | R | R | I |
| | | | 15 to 30 | R | I | I |
| | | | 30 to 100 | I | # | # |
| 16T and 22T | 3-ph 400V | FLT 5569 - 33 | 1 to 20 | R | I | I |
| | | | 20 to 100 | I | # | # |
| 27T | 3-ph 400V | FLT 5569 - 37 | 1 to 20 | R | R | R |
| | | | 20 to 70 | I | I | I |
| | | | 70 to 100 | I | I | # |
| 33T | 3-ph 400V | FLT 5113 - 50 | 1 to 10 | R | R | R |
| | | | 10 to 50 | I | I | I |
| | | | 50 to 100 | I | I | # |
| 40T | 3-ph 400V | FLT 5113 - 63 | 1 to 10 | R | R | R |
| | | | 10 to 50 | I | I | I |
| | | | 50 to 100 | I | I | # |
| 50T | 3-ph 400V | FLT 5113 - 100 | 1 to 10 | R | R | R |
| | | | 10 to 50 | I | I | I |
| | | | 50 to 100 | I | I | # |

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The levels of conducted emissions specified in standards EN 50081-1 and 50081-2 are equivalent to the levels required by the following specific standards:

| Conducted emissions from 150 kHz to 30 MHz | | |
|---|---|---|
| **Generic standard** | **Specific standard** | |
| EN 50081-1 | EN 55011 Class B<br>CISPR 11 Class B | Industrial, scientific and medical equipment |
| | EN 55014<br>CISPR 14 | Domestic electrical appliances |
| | EN 55022 Class B<br>CISPR 22 Class B | Data processing equipment |
| EN 50081-2 | EN 55011 Class A Group 1<br>CISPR 11 Class A Group 1 | Industrial, scientific and medical equipment |
| | EN 55022 Class A<br>CISPR 22 Class A | Data processing equipment |

### 3.5.8.3 - Radiated emissions

When the drive, associated with one of the RFI filters listed in section 3.5.7, is installed in a steel cabinet and the wiring recommendations have been adhered to, it meets the limits for radiated emissions defined in the generic emission standard for residential environments, EN 50081-1 (0.5M to 1.5M ratings only) and the generic emission standard - industrial environment part EN 50081-2 (1.5M/TL to 50T ratings).

**Tests have been carried out with an enclosure representative of the most common installations. It may be, on a device with different characteristics, that the levels of radiated emissions are not identical to those identified during tests.**

The tables below summarise the radiated emission results and indicate the six least favourable measurements between 30 and 1000 MHz.

| DIGIDRIVE rating | Frequency (MHz) | Emissions (dBµV/m) |
|---|---|---|
| 0.5M to 1.5M | 48.75 | 24.0 |
| | 48.85 | 24.0 |
| | 48.95 | 24.2 |
| | 49.10 | 24.1 |
| | 49.25 | 23.9 |
| | 49.55 | 23.7 |

| DIGIDRIVE rating | Frequency (MHz) | Emissions (dBµ/m) |
|---|---|---|
| 1.5M/TL to 5.5TL<br>1.5T to 5.5T | 41.45 | 36.6 |
| | 41.65 | 36.0 |
| | 40.4 | 35.9 |
| | 40.3 | 35.6 |
| | 38 | 35.3 |
| | 38.35 | 35.2 |
| 8TL and 11TL<br>8T and 11T | 46.9 | 33.2 |
| | 49.0 | 31.6 |
| | 46.45 | 27.8 |
| | 40.85 | 27.3 |
| | 63.5 | 26.2 |
| | 30.2 | 26.1 |
| 16T to 27T | 44.75 | 25.1 |
| | 45.0 | 25.3 |
| | 45.25 | 25.1 |
| | 44.25 | 25.5 |
| | 31.65 | 24.4 |
| | 32.15 | 24.4 |
| 30T to 50T | 60.7 | 30 |
| | 60.35 | 29.5 |
| | 61.1 | 29.5 |
| | 50.2 | 28.5 |
| | 50.45 | 28.5 |
| | 61.4 | 28.5 |

**Note:**
• Level authorised by standard EN 50081-1 at 10 m is 30 dBµV/m.
• Level authorised by standard EN 50081-2 is 40 dBµV/m.

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The levels of radiated emissions specified in standards EN 50081-1 and EN 50081-2 are equivalent to the levels required by the following specific standards:

| Radiated emissions from 30 to 1000 MHz | | |
|---|---|---|
| **Generic standard** | **Specific standard** | |
| EN 50081-1 | EN 55011 Class B<br>CISPR 11 Class B | Industrial, scientific and medical equipment |
| | EN 55022 Class B<br>CISPR 22 Class B | Data processing equipment |
| EN 50081-2 | EN 55011 Class A Group 1<br>CISPR 11 Class A Group 1 | Industrial, scientific and medical equipment |
| | EN 55022 Class A<br>CISPR 22 Class A | Data processing equipment |

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### 3.5.9 - Recommendations in the event of interference phenomena

Even when the elementary precautions in paragraph 3.5.5 are rigorously adhered to, it is possible that in rare cases some equipment in the installation may be affected by interference. Generally, sensitive measurement sensors are the most likely to be affected.

Experience shows that the most complex solutions are not necessarily the most effective and that in the majority of cases, very simple remedies offer the best results. The following actions should not all be undertaken; stop once the phenomenon has disappeared.

• Check that the elementary precautions in paragraph 3.5.5 have been adhered to.

• Fitting sensors: isolate from the metal structure common to the motor.

• Sensor interference suppression.

Measurement sensors are sensitive elements which can be affected by interference.

Most problems can be resolved by placing bypass capacitors (0.1 to 0.5 μF) on the sensor feedback signals. This solution is only possible for DC voltage signals (12, 24 or 48V) or AC voltage 50 Hz up to 220V.

• Protection of sensitive equipment.

If the drive has a much higher power rating than that of the sensitive equipment connected on the same mains supply, it is more economical to place an RFI filter on the power supply of the low-power equipment power supply than to install an RFI filter on the drive input. The installation recommendations are the same: filter near the device, device earthed using a short connection, separate the filter input and output wires.

• Auxiliary cable for the control electronics shielding.

If these connections are likely to pass through areas with a high level of interference, it may be advisable to double their shielding with an auxiliary cable connected at both ends. Circulating currents are then concentrated in this cable and not in the low-level connection shielding.

• MC choke

Depending on the drive rating and the distance between the motor and the drive, insert and wire up an MC choke between the motor and the drive as indicated in section 3.5.7.1.

• RFI filter

Insert and wire up an RFI filter (mains) as indicated in section 3.5.7.2.

• Shielded motor cable

Between the motor and the drive, use a shielded cable in line with the recommendations in section 3.5.7.3.

### 3.5.10 - Additional information

LEROY-SOMER will offer every assistance to the systems integrator, installer or user in providing any additional information which does not appear in this documentation, in addition to any technical support in order to resolve a particular problem.

## 3.6 - Wiring diagrams

### 3.6.1 - Power circuit diagram - Single-phase mains supply
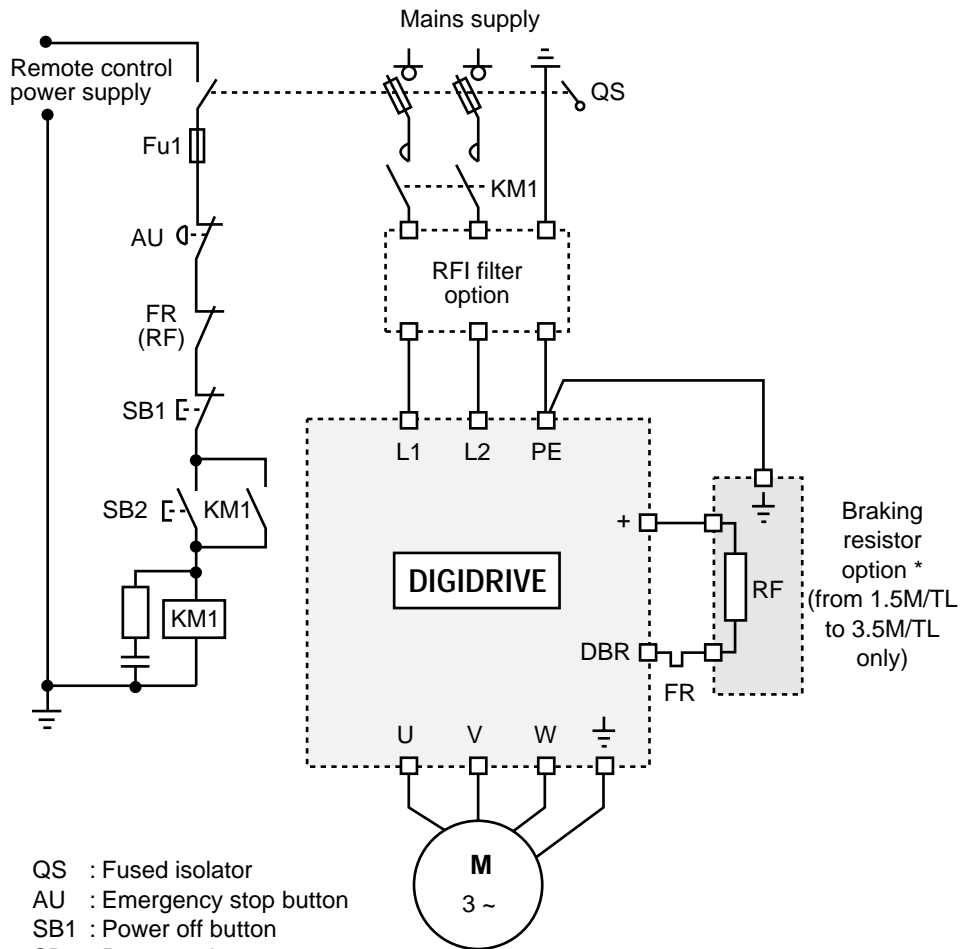


QS   : Fused isolator
AU   : Emergency stop button
SB1 : Power off button
SB2 : Power on button
KM1 : Line contactor
FR   : Thermal relay of optional braking resistors
\*     : For single-phase drives, this option is only available for
      1.5M/TL to 3.5M/TL ratings (see section 7.3)

⚠️ **• To enable the braking resistor, set parameter $30$ = 0 (for the parameter-setting procedure, see section 4.3).**

### 3.6.2 - Power circuit diagram - 3-phase mains supply
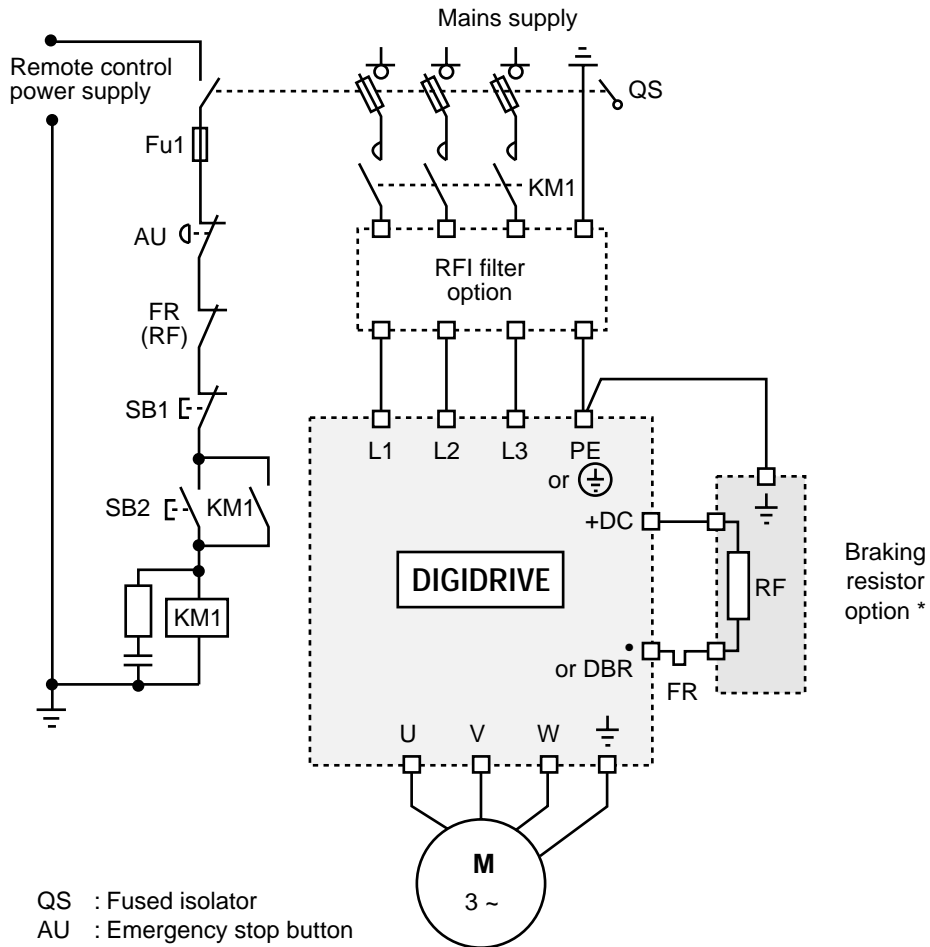


QS   : Fused isolator
AU   : Emergency stop button
SB1 : Power off button
SB2 : Power on button
KM1 : Line contactor
FR   : Thermal relay of optional braking resistors
*       : See section 7.3

⚠️ **• To enable the braking resistor, set parameter 30 = 0 (for the parameter-setting procedure, see section 4.3).**

### 3.6.3 - Power circuit diagram with motor contactor downstream of drive - Single or 3-phase mains supply
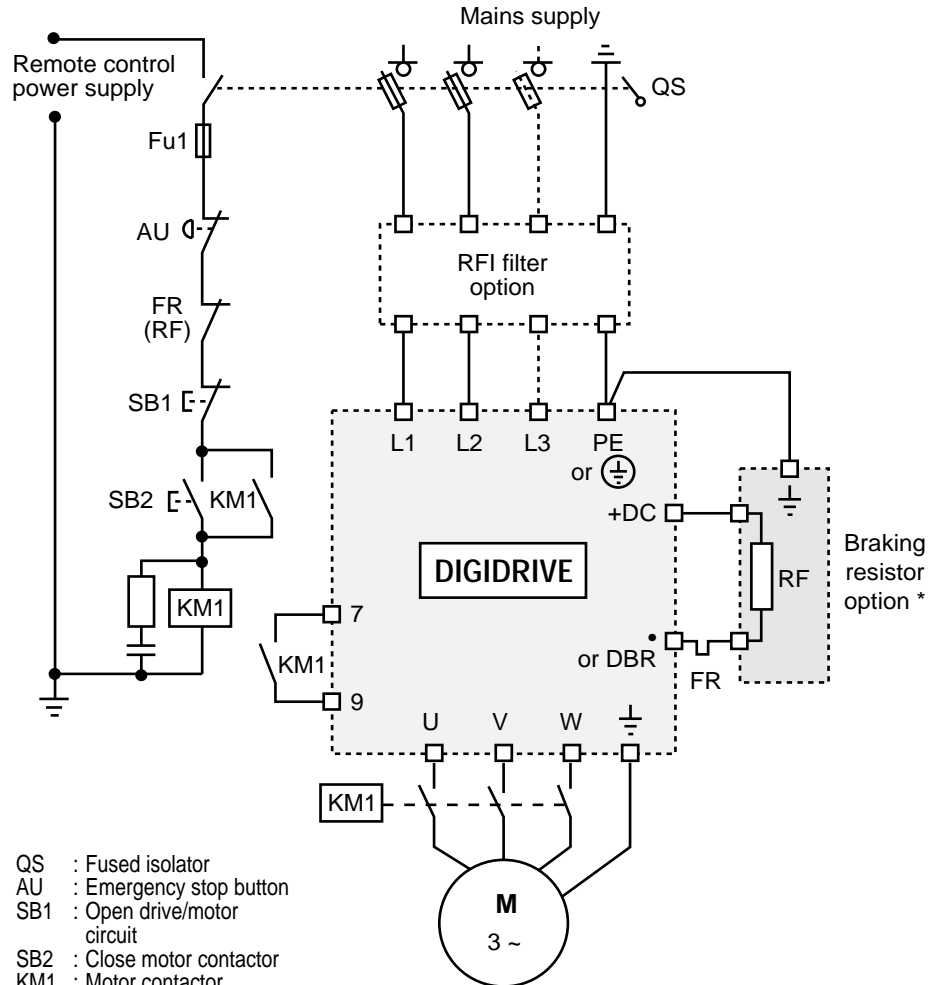


QS : Fused isolator
AU : Emergency stop button
SB1 : Open drive/motor
        circuit
SB2 : Close motor contactor
KM1 : Motor contactor
FR : Thermal relay of optional braking resistors
* : This option is available from rating 1.5M/TL (see section 7.3)

⚠ • **To enable the braking resistor, set parameter ㉚ = 0 (for the parameter-setting procedure, see section 4.3).**
**• If a braking resistor is used, it must be protected by a thermal relay which should cut off the power supply to the drive via an upstream contactor.**
**• During operation, the opening of contactor KM1 causes the freewheel stop of the motor. Check that this is not hazardous for equipment or personnel.**

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### 3.6.4 - Control circuit diagrams

### 3.6.4.1 - Control via terminal block using factory setting - Analogue reference 1 (A1), or 2 (A2), and jog operation
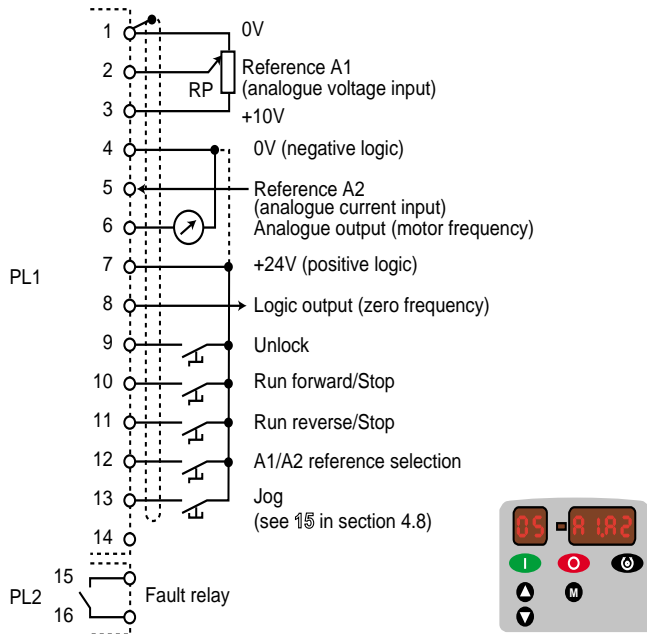


| 05 = **A1.A2** | | | |
|---|---|---|---|
| Term. 12 | Term. 13 | Reference | Assoc. parameter |
| 0 | 0 | Reference A1 | - |
| 1 | 0 | Reference A2 | 16 (*) |
| 0 | 1 | Jog | 15 |
| 1 | 1 | Jog | 15 |

⚠ • **The original configuration of the drive assumes positive logic operation.**
• **Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.**
• **See section 4.4 for configuring the drive for negative logic, and connect the common to 0V.**
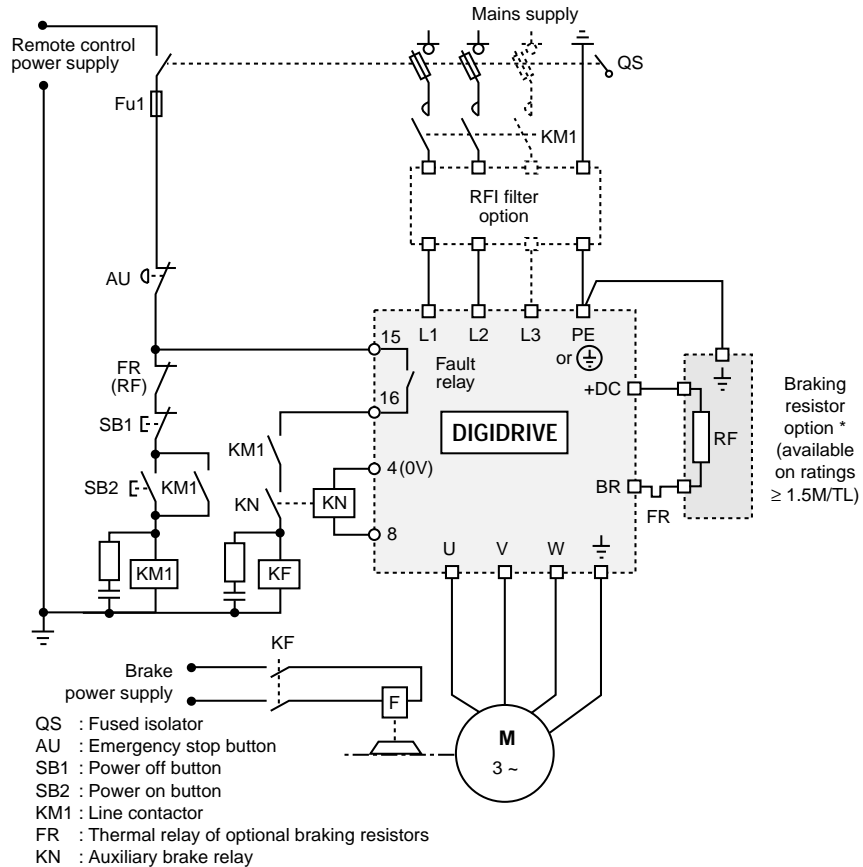
RP : 10 kΩ potentiometer (2 kΩ minimum)
(*) : **CAUTION :**
If 16 is set to 4-20mA or 20-4 mA (with detection of signal break), and the value of reference A2 is < 3mA, the drive switches to "CL". It is then impossible to select reference A1. Simply set 16 = 4-.20 or 20.-4 (without break detection), then clear the fault by pressing ⬤ , before selecting reference A1.

### 3.6.4.2 - Control via terminal block - Analogue reference 1 (A1) and 3 preset frequencies
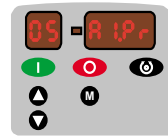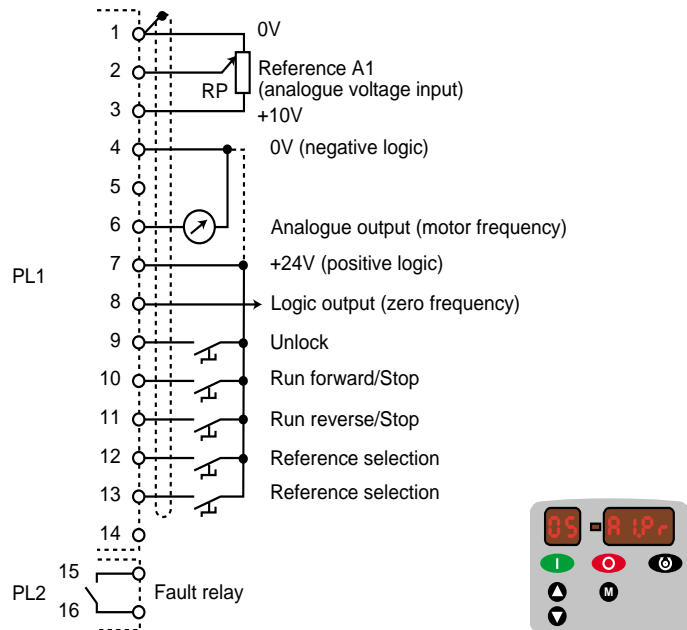


| 05 = **A1.Pr** | | | |
|---|---|---|---|
| Term. 12 | Term. 13 | Reference | Assoc. parameter |
| 0 | 0 | Reference A1 | - |
| 1 | 0 | Preset frequency no. 2 (FP2) | 12 |
| 0 | 1 | Preset frequency no. 3 (FP3) | 13 |
| 1 | 1 | Preset frequency no. 4 (FP4) | 14 |

⚠ **• The original configuration of the drive assumes positive logic operation.**
**• Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.**
**• See section 4.4 for configuring the drive for negative logic, and connect the common to 0V.**

RP : 10 kΩ potentiometer (2 kΩ minimum)

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### 3.6.4.3 - Control via terminal block - Analogue reference 2 (A2) and 3 preset frequencies

PL1

1
2
3
4 — 0V (negative logic)
5 — Reference A2 (analogue current input)
6 — Analogue output (motor frequency)
7 — +24V (positive logic)
8 — Logic output (zero frequency)
9 — Unlock
10 — Run forward/Stop
11 — Run reverse/Stop
12 — Reference selection
13 — Reference selection
14

PL2
15
16 — Fault relay
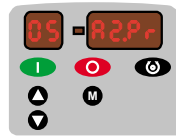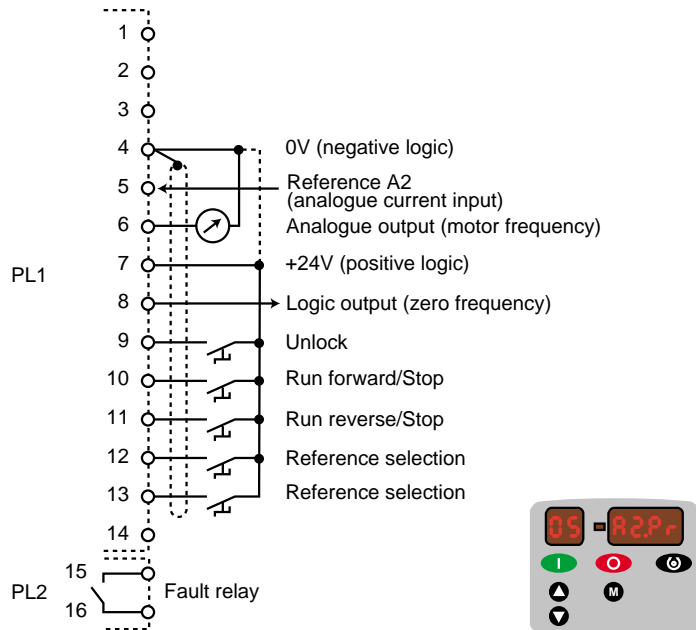
| 05 = **A2.Pr** | | | |
|---|---|---|---|
| Term. 12 | Term. 13 | Reference | Assoc. parameter |
| 0 | 0 | Reference A2 | 16 |
| 1 | 0 | Preset frequency no. 2 (FP2) | 12 |
| 0 | 1 | Preset frequency no. 3 (FP3) | 13 |
| 1 | 1 | Preset frequency no. 4 (FP4) | 14 |

⚠ • **The original configuration of the drive assumes positive logic operation.**
• **Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.**
• **See section 4.4 for configuring the drive for negative logic, and connect the common to 0V.**

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# DIGIDRIVE
## Variable speed drive

### 3.6.4.4 - Control via terminal block - 4 preset frequencies

PL1

- 1
- 2
- 3
- 4 — 0V (negative logic)
- 5
- 6 — Analogue output (motor frequency)
- 7 — +24V (positive logic)
- 8 — Logic output (zero frequency)
- 9 — Unlock
- 10 — Run forward/Stop
- 11 — Run reverse/Stop
- 12 — Reference selection
- 13 — Reference selection
- 14

PL2
- 15 — Fault relay
- 16
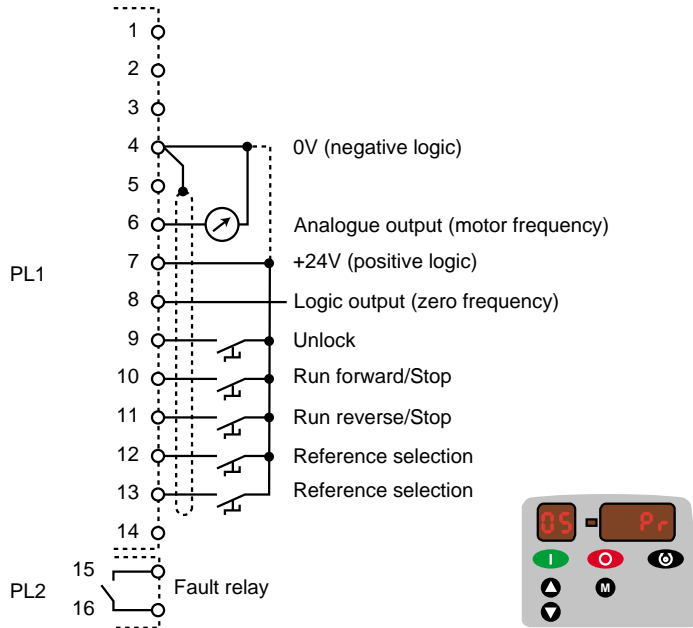
| **05 = Pr** | | | |
|---|---|---|---|
| Term. 12 | Term. 13 | Reference | Assoc. parameter |
| 0 | 0 | Preset frequency no. 1 (FP1) | 11 |
| 1 | 0 | Preset frequency no. 2 (FP2) | 12 |
| 0 | 1 | Preset frequency no. 3 (FP3) | 13 |
| 1 | 1 | Preset frequency no. 4 (FP4) | 14 |

⚠ • **The original configuration of the drive assumes positive logic operation.**
• **Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.**
• **See section 4.4 for configuring the drive for negative logic, and connect the common to 0V.**

# DIGIDRIVE
## Variable speed drive

### 3.6.4.5 - Control via keypad
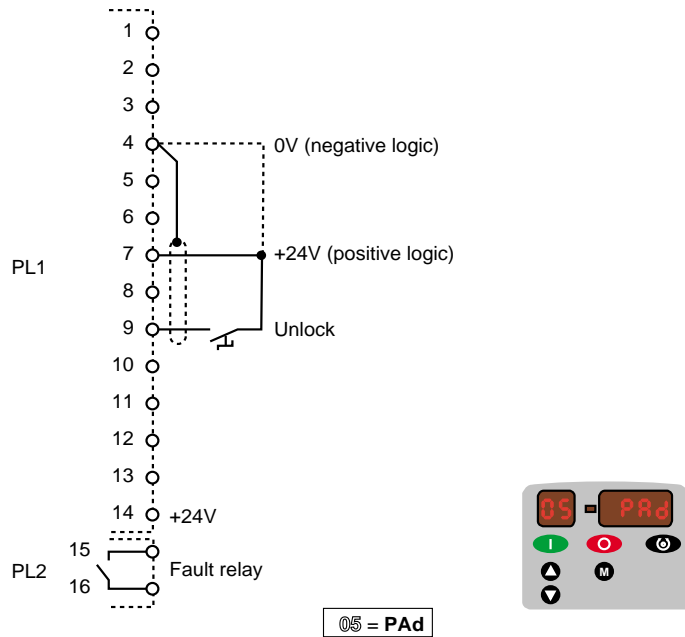


05 = PAd

⚠ • The original configuration of the drive assumes positive logic operation.
• Using a drive with a control system which has a different control logic may cause unwanted starting of the motor.
• See section 4.4 for configuring the drive for negative logic, and connect the common to 0V.

### 3.6.4.6 - Connection of PTC sensors



50 = On + Ⓜ + ⬤

⚠ • Regardless of which control logic is selected (positive or negative), connect the sensor to terminal 13 and terminal 1 or 4 (0V).
• The PTO sensor can also be used.
• For modification of this parameter to be taken into account, the drive must be locked or faulty.

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### 3.6.5 - "Brake control" preset configuration



QS : Fused isolator
AU : Emergency stop button
SB1 : Power off button
SB2 : Power on button
KM1 : Line contactor
FR : Thermal relay of optional braking resistors
KN : Auxiliary brake relay

**To select the "brake control" preset configuration, see section 4.10.**

**CAUTION:**
**The user MUST familiarise himself with commissioning the drive as explained in section 4.1.**

# DIGIDRIVE
## Variable speed drive

## 4 - COMMISSIONING
### 4.1 - Description of the operator display
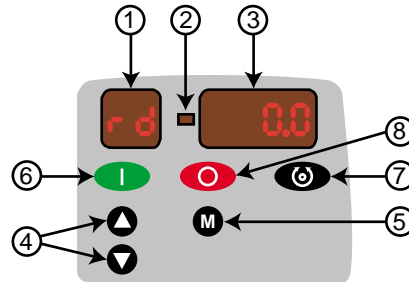
| Control | No. | Function |
|---------|-----|----------|
| **r d** | ① | 2 x 7-segment digits: display the parameters, the drive status, the speed and load units. |
| ▬ | ② | Sign for the value of the content of a parameter. |
| **0.0** | ③ | 4 x 7-segment digits: display parameter values, and error and alarm messages. |
| ▼ ▲ | ④ | • Used to scroll through the parameters.<br>• To modify the value of a parameter.<br>• To change the speed in keypad mode. |
| **M** | ⑤ | • Used to access the modification of a parameter value.<br>• Change from parameter-setting mode to Read Mode or Drive Status mode and vice versa.<br>• Stores modified parameters. |
| **I** | ⑥ | In keypad mode, is used to give the FWD or REV command to the motor. |
| **⊚** | ⑦ | • FWD/REV key<br>• In keypad mode, is used to change the direction of rotation of the motor.<br>• In its factory setting, this key is inactive. To enable it, see section 4.8, parameter 2̂6̂. |
| **O** | ⑧ | • "Reset" key<br>• Used to give the command to stop the motor in keypad mode.<br>• Clears faults in keypad or terminal block mode. |
| **M** + ▼<br>or<br>**M** + ▲<br>simultaneously | ④ + ⑤ | When modifying the value of a parameter, this key combination is used to move under the digits to be modified and speed up parameter setting. |

### 4.2 - Displaying the drive status

• The left-hand display on the DIGIDRIVE (2 x 7-segment digits) is used to display the status of the drive when stopped, and the type of speed or load during operation, whose value is shown in the right-hand display.

| Display | Comment |
|---|---|
| ih – 0.0 | • The drive is locked (terminal 9 is open). <br> • The drive is in freewheel stop mode. <br> • The drive is in the process of clearing a fault <br> (after the ⦿ key has been pressed). |
| rd – 0.0 | The drive is unlocked and ready to receive a run signal (terminal 9 is closed). |
| Fr – 50.0 | The right-hand display indicates the frequency in Hz (configurable using ㉓). |
| SP – 1450 | The right-hand display indicates the speed in min-1 (configurable using ㉓). |
| Cd – 350 | The right-hand display indicates a unit defined by the user (configurable using ㉓ and ㉔). |
| Ld – 80 | The right-hand display indicates the motor load as a percentage of the rated load (configurable using ㉒). |
| A – 2.5 | The right-hand display indicates the output current per phase (configurable using ㉒). |
| dc – 10.5 | The drive is in DC injection braking mode. |
| tr – c.L | The drive is faulty. The type of fault is shown on the right-hand display. |

• During operation, pressing the Ⓜ key for 2 seconds changes from the speed reading (Fr, SP, Cd) to the load reading (Ld, A) and vice versa.
The selected display is stored when the drive is powered down, and will therefore be identical at the next power-up.
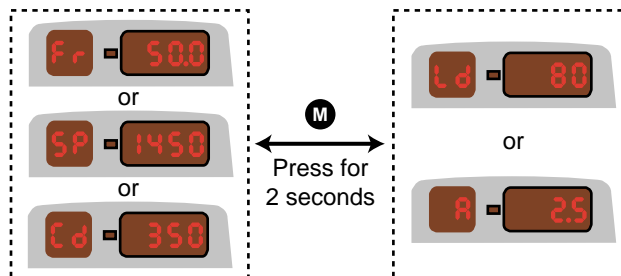
# DIGIDRIVE
# Variable speed drive

## 4.3 - Parameter setting

### 4.3.1 - Structure of parameter setting

The parameters which can be accessed via the keypad are divided into 2 levels of access:
- level 1: parameters 01 to 10 can be directly accessed in read or parameter-setting mode,
- level 2: parameters 01 to 50 can be accessed in read or parameter-setting mode after the parameters have been set: 10 = L2
  parameters 51 to 54 can only be accessed in read or parameter-setting mode when 29 = br.Eu or br.US (see explanations in section 4.10).

01 - 02 ------► 10 - 11 ------► 50 - 51 - 52 - 53 ► 54

Level 1

Level 2
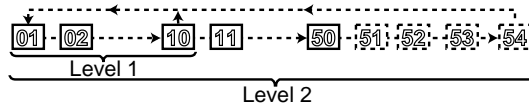
### 4.3.2 - Modifying a parameter

The following procedures illustrate the use of the DIGIDRIVE keypad.
**CAUTION:**
**• These procedures have been drawn up for initial commissioning.**
**• If the drive is already powered up, the first parameter displayed may not be 01. Simply select the parameter to be displayed or modified using the ▼ or ▲ keys.**
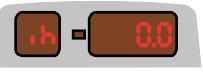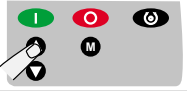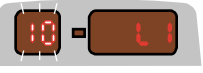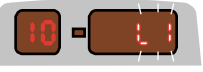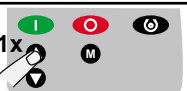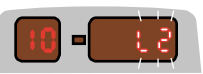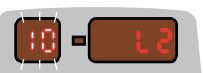
| **Action** | **Display** | **Comment** |
|---|---|---|
| | ˌh ▬ 0.0 | Power-up <br> Drive locked |
| 1x | 01 ▬ 0.0 | Access to parameter-setting mode <br> Parameter 01 is displayed flashing. <br> Its value is shown in the right-hand display. |
| 3x | 04 ▬ 10.0 | The ▼ and ▲ keys are used to access the parameter to be modified. Here, the value of parameter 04 is displayed. |
| 1x | 04 ▬ 10.0 | Access to modification of the parameter. <br> The parameter number is no longer flashing. <br> Its value is indicated in the right-hand display (the lowest order digit flashes). |
| | 04 ▬ 20.0 | Press and hold down the ▼ or ▲ key, to quickly scroll through the value of the parameter. <br> The final setting is made by short presses on these keys. If the value is negative, the LED between the two displays lights up. |
| 1x | 04 ▬ 20.0 | The new value of 04 is stored. <br> Press ▼ or ▲ to select a new parameter to modify. |
| 1x | ˌh ▬ 0.0 | Return to the initial drive status. |

# DIGIDRIVE
## Variable speed drive

### 4.3.3 - Access to level 2

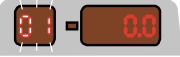| Action | Display | Comment |
|--------|---------|---------|
| | iH - 0.0 | Power-up<br>Drive locked |
| I O ◉<br>▲ 1x<br>▼ | 01 - 0.0 | Access to parameter-setting mode<br>Parameter 01 is displayed flashing. |
| I O ◉<br>M<br>▼ | 10 - L1 | Selection of parameter 10.<br>The displayed value L1 corresponds to level 1 parameter-setting access. |
| I O ◉<br>▲ 1x<br>▼ | 10 - L1 | Access to modification of the parameter.<br>(If it is a non-numeric value, the whole of the value flashes in the right-hand display). |
| I O ◉<br>1x ▲<br>M<br>▼ | 10 - L2 | Selection of level 2. |
| I O ◉<br>▲ 1x<br>▼ | 10 - L2 | Level 2 is stored.<br>Access to parameters 01 to 50 is authorised.<br>(Press ▲ or ▼ to select a new parameter if necessary). |
| I O ◉<br>▲ 1x<br>▼ | iH - 0.0 | Return to the initial drive status. |

# DIGIDRIVE
# Variable speed drive
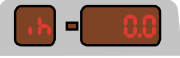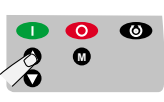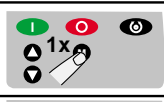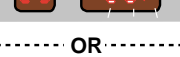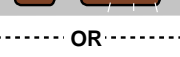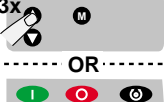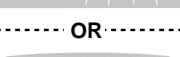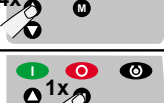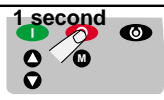
## 4.4 - Negative logic configuration

| **Action** | **Display** | **Comment** |
|---|---|---|
| | ⎡h⎤ = ⎡0.0⎤ | Power-up<br>Drive locked |
| I O ⓸<br>▲1x<br>▼ | ⎡01⎤ = ⎡0.0⎤ | Access to parameter-setting mode<br>Parameter 01 is displayed flashing. |
| I O ⓸<br>M<br>▼ | ⎡34⎤ = ⎡On⎤ | Selection of parameter 34.<br>**CAUTION :**<br>**It is not possible to access parameter 34**<br>**until 10 has been set to L2**<br>**(see procedure in section 4.3.3).** |
| I O ⓸<br>▲1x<br>▼ | ⎡34⎤ = ⎡On⎤ | Access to the modification of the parameter.<br>The value " On " flashes. |
| I O ⓸<br>M<br>1x▲ | ⎡34⎤ = ⎡OFF⎤ | Selection of negative logic. |
| I O ⓸<br>▲2x<br>▼ | ⎡h⎤ = ⎡0.0⎤ | Return to the initial drive status.<br>Do not lock the drive (terminal 9 must remain open). |
| 1 second ⓸<br>I O<br>▲ M<br>▼ | ⎡h⎤ = ⎡0.0⎤ | Confirm negative logic modification.<br>The drive can now be unlocked (terminal 9 closed). |

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# DIGIDRIVE
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## 4.5 - Return to factory settings (with or without preset configuration)

⚠️ • **Before returning to factory settings, check that this will not affect the safety of the system.**

| Action | Display | Comment |
|---|---|---|
| | | Power-up<br>Drive locked |
| 1x | | Access to parameter-setting mode<br>Parameter 01 is displayed flashing. |
| | | Selection of parameter 29.<br>**CAUTION:**<br>**It is not possible to access parameter 29 until 10 has been set to L2 (see procedure in section 4.3.3).** |
| 1x | | Access to modification of the parameter. |
| 1x | | Selection of factory setting for 50Hz mains supply. |
| **OR** | **OR** | |
| 2x | | Selection of factory setting for 60Hz mains supply. |
| **OR** | **OR** | |
| 3x | | Selection of factory setting for 50Hz mains supply with "brake control" configuration. |
| **OR** | **OR** | |
| 4x | | Selection of factory setting for 60Hz mains supply with "brake control" configuration. |
| 1x | | The value has been modified<br>(eg.: 50Hz mains supply). |
| 1x | | Return to the initial drive status. |
| 1 second | | Confirm the chosen configuration.<br>Return to parameter 01. The value of parameter 10 is automatically set to L1 (access to level 1). |

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## 4.6 - Using a security code

### 4.6.1 - Locking the settings using a security code.

| Action | Display | Comment |
|---|---|---|
| | .h = 0.0 | Power-up<br>Drive locked |
| 1x | 01 = 0.0 | Access to parameter-setting mode<br>Parameter 01 is displayed flashing. |
| | 25 = 0 | Selection of parameter 25.<br>**CAUTION:**<br>**It is not possible to access parameter 25**<br>**until 10 has been set to L2**<br>**(see procedure in section 4.3.3).** |
| 1x | 25 = 0 | Access to modification of the parameter. |
| 5x | 25 = 5 | Enter the security code.<br>For example code 5.<br>**CAUTION:**<br>**Code 0 is not permitted.** |
| 1x | 25 = 0 | The security code is taken into account.<br>Parameter 25 returns to 0. |
| | 10 = L2 | Return to parameter 10 to store the<br>security code. |
| 1x | 10 = L2 | Access to parameter setting of 10. |
| 1x | 10 = LoC | Select the value " LoC ". |
| 1x | 10 = L1 | The security code is stored. Parameter<br>10 automatically returns to value L1. |
| 1x | 10 = L1 | Parameters 01 to 10 can only be accessed<br>in read mode. To access the other parameters<br>(in read mode only), 10 must  be set to L2. |
| 1x | .h = 0.0 | Return to the initial drive status. |

### 4.6.2 - Access to parameter setting using a security code

| Action | Display | Comment |
|---|---|---|
| | | Power-up<br>Drive locked |
| | | Access to parameter-setting mode<br>Parameter 01 is displayed flashing.<br>Select the parameter to be modified. For example, parameter 01. |
| | | The message " CodE " flashes on the right-hand indicator.<br>Access to parameter-setting mode is blocked. |
| | | The left-hand indicator displays " CO " to remind the user that this phase corresponds to setting the code. |
| | | Display the security code using the ▼ or ▲ keys (for example, code 5). |
| | • Correct code :<br><br>• Incorrect code : | The value of the parameter can now be modified. Parameter-setting mode is now accessible for all parameters<br>**CAUTION:**<br>**If the code is incorrect, restart the procedure** |
| | | Modification of the parameter. |
| | | If necessary, select a new parameter to be modified. When the modifications have been completed, setting the drive parameters must again be blocked. |
| | | Select parameter 10. |
| | | Its value is " L1 " or " L 2 " (depending on which parameters have been modified previously).<br>For example : 10 **= L1.** |
| | | Select the value " LoC " to reactivate the security code. |
| | | The security code is stored. Parameter 10 automatically returns to value L1. |
| | | Parameters 01 to 10 can only be accessed in read mode. To access the other parameters (read mode only), parameter 10 must be set to L2. |
| | | Return to the initial drive status. |

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### 4.6.3 - Deleting a security code

| Action | Display | Comment |
|--------|---------|---------|
| | rh = 0.0 | Power-up<br>Drive locked |
| 1x | 01 = 0.0 | The parameters can only be accessed in read mode. |
| M | 25 = 0 | Selection of parameter 25.<br>**CAUTION:**<br>**It is not possible to access parameter 25 until 10 has been set to L2 (see procedure in section 4.4.3)**<br>**Enter the security code (see procedure in section 4.6.2).** |
| | 25 = 0 | Parameter setting can now be accessed. |
| 3x | 25 = 0<br>rh = 0.0<br>25 = 0 | Deletion of security code.<br>(Each time the key is pressed, the displays change state). |
| M | 10 = L2 | Selection of parameter 10. |
| 1x | 10 = L2 | Its value is always L2. |
| 1x M | 10 = LoC | Select the value " LoC " to enable the procedure for deleting the security code. |
| 1x M | 10 = L1 | The security code is deleted. Parameter 10 automatically returns to value L1. |
| 1x | 10 = L1 | Parameters 01 to 10 can be accessed.<br>To access the other parameters, 10 must be set to L2. |
| 1x | rh = 0.0 | Return to the initial drive status. |

## 4.7 - Commissioning the drive using level 1

⚠ • **The drives use software which is adjusted by parameters.**
• **The performance levels obtained depend on the parameter setting.**
• **Incorrect settings may have serious consequences.**
• **The drives should only be programmed by the appropriate qualified personnel.**

## 4.7.1 - Power-up

⚠ • **Before powering up the drive, check that the power connections and motor connection are correct, and that any moving parts are mechanically protected.**
• **Users of the drive should take particular care to avoid starting it accidentally.**

### 4.7.2 - Setting the essential parameters - level 1

⚠ • **The level 1 parameters must be set before giving a start command.**
• **The parameter values affect protection of the motor and the safety of the system.**
• **Parameters concerning the motor must be set using the information given on the nameplate of the motor used (a minimum accuracy of 10% is necessary in order to obtain good performance levels).**

### 4.7.2.1 - List of parameters ⓪ to ①⓪:
Glossary:
R - W: Read-write parameter.
RO: Read-only parameter.
$I_{sn}$: Rated output current of the drive.
**CAUTION:**
**The factory settings are given for a 50 Hz mains supply**

| Parameter | Name | Type | Adjustment range | Factory setting |
|---|---|---|---|---|
| 01 | Minimum limit | R - W | 0 to 02 | 0 |
| 02 | Maximum limit | R - W | 0 to 1000.0 Hz | 50.0 Hz |
| 03 | Acceleration ramp 1 | R - W | 0 to 3200.0s/100 Hz | 5.0s/100 Hz |
| 04 | Deceleration ramp 1 | R - W | 0 to 3200.0s/100 Hz | 10.0s/100 Hz |
| 05 | Reference selection | R - W | A1.A2, A1.Pr, A2.Pr, Pr, PAd | A1.A2 |
| 06 | Motor rated current | R - W | 0 to $I_{sn}$ | $I_{sn}$ |
| 07 | Motor rated speed (at full load) | R - W | 0 to 9999 min⁻¹ | 1500 min⁻¹ |
| 08 | Motor rated voltage | R - W | 0 to 240V or 0 to 480V | 230V or 400V |
| 09 | Power factor (cos φ) | R - W | 0 to 1.00 | 0.85 |
| 10 | Level 2 access and storage of security code | R - W | L1, L2, Loc | L1 |

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### 4.7.2.2 - Explanation of the parameters

**01** : **Minimum limit**

Adjustment range : 0 to **02**
Factory setting : 0
This parameter defines the minimum frequency.

**CAUTION:**

• **This parameter is inactive during jog operation.**

• **If the value of 02 is lower than that of 01, the value of 01 is automatically changed to the new value of 02.**

**02** : **Maximum limit**

Adjustment range : 0 to 1000.0 Hz
Factory setting : **Eur = 50.0 Hz**
         USA = 60.0 Hz
This parameter defines the maximum frequency in both directions of rotation.

**CAUTION:**

**Slip compensation and the current limit may give a slightly higher output frequency.**

**03** : **Acceleration ramp 1**

Adjustment range : 0 to 3200.0s/100Hz
Factory setting : 5.0s/100Hz
Adjustment of the time to accelerate from 0 to 100 Hz.

$$03 = \frac{t \times 100Hz}{(F2-F1)Hz}$$
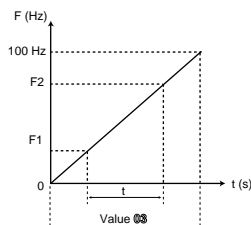


Example:
The application requires acceleration from 20Hz to 50Hz in 1.5 seconds.
The value to be set in 03 is therefore:

$$03 = \frac{1.5s \times 100Hz}{(50-20)Hz} = 5$$

**CAUTION:**

**In cases where 03 = 0, a minimum ramp of 0.1s/100 Hz is still active.**

**04** : **Deceleration ramp 1**

Adjustment range : 0 to 3200.0 s/100Hz
Factory setting : 10.0 s/100Hz
Adjustment of the time to decelerate from 100 Hz to 0.

$$04 = \frac{t \times 100Hz}{(F2-F1)Hz}$$
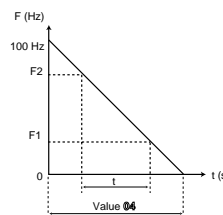


Example:
The application requires deceleration from 50Hz to 20Hz in 3 seconds.
The value to be set in 04 is therefore:

$$04 = \frac{3s \times 100Hz}{(50-20)Hz} = 10$$

**CAUTION:**

• **If 30 = 1 or 2, the deceleration ramp may be modified by the drive automatically.
(See explanation of parameter 30 in section 4.8).**

• **In cases where 04 = 0, a minimum ramp of 0.1s/100 Hz is still active.**

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| 05 | : Selection of references |

Adjustment range : A1.A2, A1.Pr, A2.Pr,
 Pr, Pad
Factory setting : **Eur = A1.A2**
 USA = Pad

**A1.A2: Selection of analogue reference 1 (A1) or 2 (A2), and jog operation, via logic inputs.**

**A1.Pr:** selection of analogue reference 1 (A1) or 3 preset frequencies, via logic inputs.

**A2.Pr:** selection of analogue reference 2 (A2) or 3 preset frequencies, via logic inputs.

**Pr:** selection of the preset frequencies via logic inputs.

**Pad:** keypad reference.

(See the control circuit diagrams in sections 3.6.4.1 to 3.6.4.5).

| 06 | : Motor rated current |

Adjustment range : 0 to $I_{sn}$ (A)
 (drive rated current)
Factory setting : $I_{sn}$

This is the value of the motor rated current indicated on the nameplate. Above this value the motor is overloaded.

| 07 | : Motor rated speed
 (at full load) |

Adjustment range : 0 to 9999 min⁻¹
Factory setting : **Eur = 1500 min⁻¹**
 USA = 1800 min⁻¹

This is the on-load speed of the motor indicated on the nameplate.

**CAUTION:**

**In the case of applications with high inertia (eg: ventilation) overvoltages can occur on the DC bus. In this case, set 07 to 0.**

| 08 | : Motor rated voltage |

Adjustment range : M/TL = 0 to 240 V
 T = 0 to 480V
Factory setting : M/TL = 230V
 T = **Eur: 400V**
 USA: 460V

Defines the voltage/frequency ratio as follows:
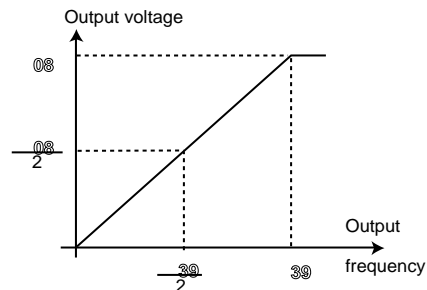


| 09 | : Power factor
 (Cos φ ) |

Adjustment range : 0 to 1.00
Factory setting : 0.85

The power factor is measured automatically during an autocalibration phase in level 2 (see 38) and set in this parameter. If it has not been possible to carry out the autocalibration procedure, enter the Cos φ value indicated on the motor nameplate.

| 10 | : Level 2 access and
 storage of security code |

Adjustment range : L1, L2, Loc
Factory setting : L1

**L1: Level 1 access. Only parameters 01 to 10 can be accessed via the keypad.**

**L2:** Level 2 access. Parameters 01 to 54 can be accessed via the keypad.

**Loc:** Used to store or reactivate a security code (see the procedure in section 4.6).

### 4.7.3 - Starting the motor

#### 4.7.3.1 - Control from the terminal block
**- Voltage reference (A1)**

- Check the power (sections 3.6.1 to 3.6.3) and control (section 3.6.4.1: factory setting) circuit connections.
- To avoid accidental starting of the motor on power-up, check that the contacts of terminals 10 and 11 are open.
- Set the potentiometer to minimum, and leave terminals 12 and 13 open in order to select the voltage reference (A1).
- Switch on: The left-hand display indicates "ih".
- Check that the motor parameters have been filled in according to the table in section 4.7.2.1.

- Then for the autocalibration phase, there are 2 possible scenarios: if this is the first time the drive has been commissioned, follow item 1), if not follow item 2).

1) On initial commissioning, the drive will automatically perform autocalibration without rotation (measurement of the stator resistance and the motor voltage offset, required for the drive/motor to operate correctly).
- Close the drive unlock contact (terminal 9). The left-hand display indicates "rd".
- Give a jog command (close then open terminal 10 or 11). The left-hand display indicates "Fr" and the right-hand one briefly indicates "Auto" then "tunE", which indicates that the drive is performing autocalibration without motor rotation. The right-hand display then reverts to "0.0".
However, in certain cases, in order to obtain optimum performance, it is possible to perform autocalibration with rotation, if the application allows.

To perform this type of autocalibration, follow item 2).

2) Select level 2 of parameter setting, by setting $10$ = L2.
- Set $38$ = 1 to select autocalibration without rotation, or $38$ = 2 for autocalibration with rotation.

⚠ • **For autocalibration with rotation, measurement must be performed with the motor uncoupled as the drive drives the motor at 2/3 of its rated speed.**
    • **Ensure that this operation does not pose any risk to safety.**
- Close the drive unlock contact (terminal 9). The left-hand display indicates "rd".
- Give a jog command (close then open terminal 11 or 12).
When autocalibration with rotation has been selected, the motor performs one FWD rotation, then stops.
During autocalibration (with or without rotation), the right-hand display indicates "Auto" and "tunE" alternately. The right-hand display then reverts to "0.0".

- Once the autocalibration phase is complete, continue with commissioning as below.
- Select a run command and close the corresponding contact (terminal 10 or 11).
- Increase the reference using the potentiometer, until the motor has reached the required speed.
The left-hand display indicates "Fr", and the right-hand display indicates the output frequency in Hz.
- Open the run command contact (terminal 10 or 11 depending on the choice made previously). The motor slows down and stops. The left-hand display indicates "rd" when the motor is stopped.

**CAUTION:**
**• If the FWD/Stop and REV/Stop terminals are closed simultaneously, the motor will stop according to the selected ramp and stop mode.**
**• If jog operation is selected while the drive is controlled via the analogue voltage or current input, the motor will accelerate or decelerate according to the ramps set in ⓪③ or ⓪④ to the programmed jogging speed. When this speed is reached, the ramps become those for jog operation, ie. 0.2 s.**

### 4.7.3.2 - Control from the keypad
- Check the power (sections 3.6.1 to 3.6.3) and control (section 3.6.4.5) circuit connections.
- Switch on the drive: The left-hand display indicates "ih".
- Check that the motor parameters have been filled in according to the table in section 4.7.2.1.
- This operating mode requires the modification of the factory setting of parameter ⓪⑤.
- Follow the procedure below:

| Action | Display | | Comment |
|---|---|---|---|
| **M** | 01 | 0.0 | Access to Parameter-setting mode |
| 4 x ▲ | 05 | A1.A2 | Selection of parameter ⓪⑤ |
| **M** | 05 | A1.A2 | Access to parameter modification |
| 4 x ▲ | 05 | PAd | Selection of keypad mode |
| **M** | 05 | PAd | Storage of the new value |
| **M** | ih | 0.0 | Return to initial status |

- Close the drive unlock contact (terminal 9). The left-hand display indicates "rd".
- Give a run command using the **I** key. The display indicates "Fr".
- Press the ▲ key to increase the motor speed, either holding the key down to increase it quickly or using successive single presses for more accurate setting of the required motor speed.
- Set ㉖ to On, then press the **⊚** key to reverse the direction of rotation.
- Reduce the motor speed using the ▼ key until it has completely stopped and/or give a stop command using the **⊙** key. The left-hand display indicates "rd".

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### 4.8 - Setting the level 2 parameters

#### 4.8.1 - List of parameters 11 to 50

Glossary:
R - W: Read-write parameter.
RO: Read-only parameter.
**CAUTION: The factory settings are given for a 50 Hz mains supply**

| Parameter | Name | Type | Adjustment range | Factory |
|---|---|---|---|---|
| 11 | Preset frequency 1 | R - W | ±1000.0 Hz | 0 |
| 12 | Preset frequency 2 | R - W | ±1000.0 Hz | 0 |
| 13 | Preset frequency 3 | R - W | ±1000.0 Hz | 0 |
| 14 | Preset frequency 4 | R - W | ±1000.0 Hz | 0 |
| 15 | Jog operation frequency | R - W | 0 to 400.0 Hz | 1.5 Hz |
| 16 | Selection of the type of signal for analogue input 2 (A2) | R - W | 0-20, 20-0, 4-20, 20-4, 4-.20, 20-.4 (mA) | 4-.20 mA |
| 17 | Selection of bi-directional mode | R - W | OFF or On | OFF |
| 18 | Fault - 1 | RO | 0 to 189 (see section | |
| 19 | Fault - 2 | RO | 0 to 189 (see section | |
| 20 | Fault - 3 | RO | 0 to 189 (see section | |
| 21 | Fault - 4 | RO | 0 to 189 (see section | |
| 22 | Selection of load display | R - W | Ld, A | Ld |
| 23 | Unit for displaying speed | R - W | Fr, SP, Cd | Fr |
| 24 | Customer-defined unit scaling | R - W | 0 to 99.99 | 1.00 |
| 25 | Security code | R - W | 0 to 9999 | 0 |
| 26 | Enable FWD/REV key on the keypad | R - W | OFF or On | OFF |
| 27 | Keypad reference on power-up | R - W | 0, LASt, PrS1 | 0 |
| 28 | Copy parameters | R - W | no, rEAD, Prog, Auto, boot | no |
| 29 | Return to factory settings and brake control | R - W | no, Eur, USA, br.Eu, br.US | no |
| 30 | Deceleration mode | R - W | 0 to 2 | 1 |
| 31 | Stop mode | R - W | 0 to 3 | 1 |
| 32 | Selection of dynamic U/f ratio | R - W | OFF or On | OFF |
| 33 | Selection of flying restart | R - W | 0 to 3 | 0 |
| 34 | Control logic polarity | R - W | OFF or On | On |
| 35 | Management of logic commands | R - W | 0 to 3 | 0 |
| 36 | Assignment of the analogue output | R - W | Fr, Ld, AdV | Fr |
| 37 | Switching frequency | R - W | 3, 6, 12 kHz | 6 kHz |
| 38 | Selection of autocalibration | R - W | 0 to 2 | 0 |
| 39 | Motor rated frequency | R - W | 0 to 1000.0 Hz | 50.0 Hz |
| 40 | Number of motor poles | R - W | Auto, 2P, 4P, 6P, 8P | Auto |
| 41 | Serial link mode | R - W | AnSI, Ct, FbUS | AnSI |
| 42 | Serial link transmission speed | R - W | 2.4 - 4.8 - 9.6 - 19.2 | 4.8 |
| 43 | Serial link address | R - W | 0 to 24.7 | 1.1 |
| 44 | Software version | RO | 1.00 to 99.99 | |
| 45 | Station address | R - W | 0 to 255 | 0 |

# DIGIDRIVE
## Variable speed drive

| Parameter | Name | Type | Adjustment range | Factory |
|---|---|---|---|---|
| 46 | Fieldbus transmission speed | R - W | 0 to 9 | 0 |
| 47 | Fieldbus diagnostics | R - W | ± 9999 | 0 |
| 48 | Control mode | R - W | 0 to 3 | 3 then 1 |
| 49 | Boost | R - W | 0 to 25.0% of motor Un | 3.0% motor Un |
| 50 | Assignment of terminal 13 to PTC sensors | R - W | On, OFF | OFF |

### 4.8.2 - Explanation of parameters 11 to 50

11 : **Preset frequency 1**
Adjustment range : ±1000.0 Hz
Factory setting : 0
Used to define preset frequency FP1.
For negative frequencies, see parameter 17.

12 : **Preset frequency 2**
Adjustment range : ±1000.0 Hz
Factory setting : 0
Used to define preset frequency FP2.
For negative frequencies, see parameter 17.

13 : **Preset frequency 3**
Adjustment range : ±1000.0 Hz
Factory setting : 0
Used to define preset frequency FP3.
For negative frequencies, see parameter 17.

14 : **Preset frequency 4**
Adjustment range : ±1000.0 Hz
Factory setting : 0
Used to define preset frequency FP4.
For negative frequencies, see parameter 17.

15 : **Jog operation frequency**
Adjustment range : 0 to 400.0 Hz
Factory setting : 1.5 Hz
Used to define the operating frequency of the jog operation input.
To enable jog operation, close terminal 13 "Jogging" and give a Run forward command via terminal 10 or Run reverse command via terminal 11.
(See the diagram in section 3.6.4.1).

16 : **Selection of the type of signal on analogue input 2 (A2)**
Adjustment range : 0-20, 20-0, 4-20, 20-4, 4-.20, 20-.4
Factory setting : 4-.20
Used to define the type of signal on the analogue current input:
**0-20:** 0-20 mA.
**20-0:** 20-0 mA.
**4-20:** 4-20 mA (with detection of signal break ≤ 3 mA).
**20-4:** 20-4 mA (with detection of signal break ≤ 3 mA).
**4-.20 : 4-20 mA (without detection of signal break).**
**20-.4:** 20-.4 mA (without detection of signal break).

**17** : Selection of bi-directional mode

Adjustment range : OFF or On
Factory setting : OFF
**OFF: all negative references are treated as zero.**
**On:** used for changing the direction of rotation by the reference polarity. May be determined by the preset frequencies or the keypad reference.
**CAUTION :**
**17 has no effect on analogue inputs.**
**Note:** If using the PM10V option (±10V Analogue Input option), the value of this parameter is irrelevant.

**18** : Fault - 1

Adjustment range : 0 to 199
Indicates the most recent fault.

**19** : Fault - 2

Adjustment range : 0 to 199
Indicates the second fault.

**20** : Fault - 3

Adjustment range : 0 to 199
Indicates the third fault.

**21** Fault - 4

Adjustment range : 0 to 199
Indicates the fourth fault.

**22** : Selection of the load display
Adjustment range : Ld, A
Factory setting : Ld
This parameter is used to obtain an indication of the load or the total current on the display.
**Ld: displays the drive load level.**
**A:** displays the total motor current.

**CAUTION:**
**During operation, pressing the (M) key for 2 seconds changes from the speed reading (Fr, SP, Cd) to the load reading (Ld, A) and vice versa. The selected display is stored when the drive is powered down, and will therefore be identical at the next power-up.**

**23** : Unit for displaying the speed
Adjustment range : Fr, SP, Cd
Factory setting : Fr
**Fr: Output frequency expressed in Hz.**
**SP:** Motor speed expressed in min$^{-1}$.
**Cd:** Customer unit defined using a coefficient determined in parameter **24** as follows:
Cd = motor speed in min$^{-1}$ x parameter **24**.
**CAUTION:**
**During operation, pressing the (M) key for 2 seconds changes from the speed reading (Fr, SP, Cd) to the load reading (Ld, A) and vice versa. The selected display is stored when the drive is powered down, and will therefore be identical at the next power-up.**

**24** : Customer-defined unit scaling
Adjustment range : 0 to 99.99
Factory setting : 1.00
This is a multiplication coefficient applied to the motor speed in min$^{-1}$, for expressing the speed in a unit defined by the user (see **23**).
Example:
- to obtain a reading in m/min on the drive display
- application: conveyor belt on which products are moving 200 mm per motor revolution
- set **24** = 0.2
- this gives, for a motor speed of 1500 min$^{-1}$:

| 23 | Display | Unit |
|---|---|---|
| Cd | Cd - 300 | m/min |

# DIGIDRIVE
## Variable speed drive

25 : **Security code**
Adjustment range : 0 to 9999
Factory setting : 0
This is used for entering a security code preventing access to parameter-setting mode. See parameter 10.
The personal code can only be read when it is being entered.
Do not use code 0.
To access a parameter, enter the personal code in the parameter, when the drive indicates "CodE" on the display.

26 : **Enable the FWD/REV key on the keypad**
Adjustment range : OFF or On
Factory setting : OFF
**OFF: FWD/REV key disabled.**
**On:** enables the FWD/REV key on the keypad.

27 : **Keypad reference on power-up**
Adjustment range : 0, LASt, PrS1
Factory setting : 0
In keypad mode (5: PAd) is used to select the speed reference value on power-up.
**0 : the reference is zero.**
**LASt:** the reference corresponds to the last value selected when the drive was powered down.
**PrS1:** the reference corresponds to the value of preset frequency 1.

28 : **Copy parameters**
Adjustment range : no, rEAD, Prog, Auto, boot
Factory setting : no
**no: no communication with the copy key.**
**rEAD:** transfers the parameters stored in the copy key to the drive. To enable this transfer, the drive must be locked, unlocked or faulty and the user should reset the drive ( O key).
When the data has been transferred, parameter 28 returns to value "no".

**Prog:** transfers the drive parameters to the copy key. To enable this transfer, reset the drive ( O key). When the data has been transferred, parameter 28 returns to value "no".
**Auto:** transfers the drive parameters to the copy key.
Any modification of a parameter is then automatically saved to the copy key.
**boot:** if, on power-up, a key is present and 28 has been saved as boot in the key, the key parameters are automatically transferred and stored in the drive memory. Any modification of a parameter is then automatically saved to the copy key.

⚠ **• When installing or uninstalling the copy key, switch off the drive.**

**CAUTION:**
**• When parameters are being transferred to the copy key, parameter 28 should be stored as follows:**
**- if 28 = no, rEAD, Prog in the drive, parameter 28 should be set to " no " in the key**
**- if 28 = Auto or boot in the drive, parameter 28 should be set to "Auto" or "boot" in the key. Thus, if a drive is powered up with a copy key, in which 28 is stored as "boot", all the parameters in memory in the key will be instantly transferred to the DIGIDRIVE.**
**• The copy key can be used on drives of different ratings, but the parameters described below will not be copied, and the drive will go into fault mode "C.rtg". Press the O key and check the following parameters:**
06 : Motor rated current.
08 : Motor rated voltage.

**29** **: Return to factory settings and brake control**

Adjustment range : no, Eur, USA, br.Eu, br.US

Factory setting : no

**CAUTION:**

**Lock the drive before changing 29.**

**no: Return to factory settings is not performed.**

**Eur:** Configures the drive to factory settings for 50Hz mains supply.

**USA:** Configures the drive to factory settings for 60Hz mains supply.

**br.Eu:** Configures the drive to factory settings for 50Hz mains supply with "brake control" configuration (provides access to parameters 51 to 54, see section 4.9).

**br.US:** Configures the drive to factory settings for 60Hz mains supply with "brake control" configuration (provides access to parameters 51 to 54, see section 4.9).

After modifying 29, press the Reset key ⊙ . The display returns to 01, and parameter 10 reverts to "L1".

**30** **: Deceleration mode**

Adjustment range : 0 to 2

Factory setting : 1

**0:** Standard deceleration ramp. If the deceleration ramp which has been set is too fast in relation to the inertia of the load, the DC bus voltage exceeds its maximum value and the drive switches to overvoltage fault "OU".

**1 : Standard deceleration ramp with automatic extension of the ramp time in order to avoid causing a DC bus overvoltage fault on the drive.**

**2 :** The drive allows the motor voltage to be increased to 1.2 times the rated voltage set in 08 (motor rated voltage), to avoid reaching the maximum DC bus voltage threshold.

However, if this is not adequate, the standard deceleration ramp time is extended, to avoid causing a DC bus overvoltage fault on the drive.

Mode 2 offers faster deceleration than mode 1, for the same amount of energy, assuming that the motor can withstand the losses.

⚠ **• If a braking resistor is connected to the drive, it is essential to set parameter 30 = 0.**

**31** **: Stop mode**

Adjustment range : 0 to 3

Factory setting : 1

**CAUTION:**

**During operation, opening the unlock terminal (terminal 9), causes the motor to stop in free wheel mode, regardless of the value of 31.**

**0:** freewheel stop.

The power bridge is deactivated as soon as the stop command is given.

The drive cannot receive another run command for 2s, the motor demagnetisation time.

The display indicates "rd" 2s after the stop command. The machine stopping time depends on its inertia.
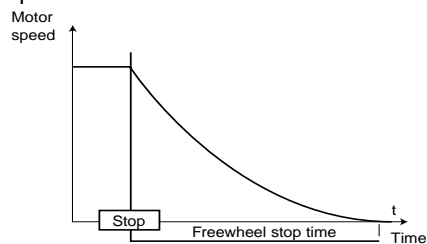
# DIGIDRIVE
## Variable speed drive

**1: stop on deceleration ramp.**
**The drive decelerates the motor according to the deceleration mode chosen in parameter 30 .**
**One second after the stop, the display indicates "rd".**
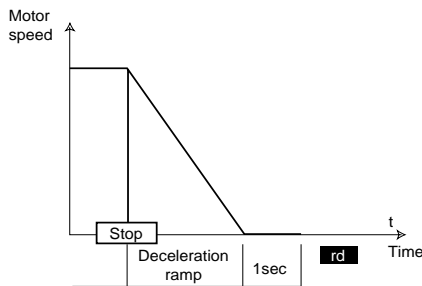


**2:** stop on deceleration ramp with DC injection for 1s.

The drive decelerates the motor according to the deceleration mode chosen in parameter 30.

When zero frequency is reached, the drive injects DC current for 1 second.

The drive then displays "rd ".
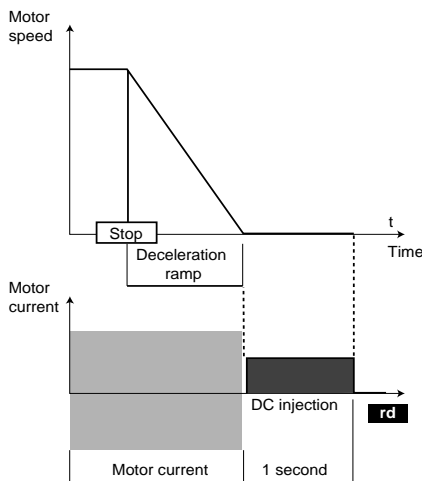


**3:** stop by DC injection braking, and elimination at zero speed.

The drive decelerates the motor by setting a low frequency current resulting in almost zero speed, which the drive detects automatically.

The drive then injects DC current for 1 second. The drive then displays "rd". No run command can be taken into account until rd is displayed.
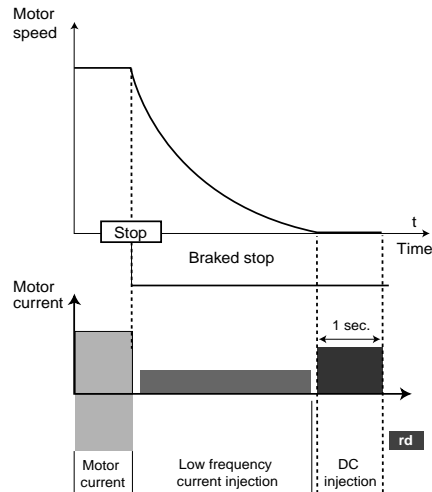


**32** **: Selection of dynamic U/f ratio**

Adjustment range : OFF or On
Factory setting : OFF
**OFF: the U/F ratio is fixed and set by the base frequency (39).**
**On:** dynamic U/F ratio.
Generates a voltage/frequency characteristic which varies with the load. It is for use in quadratic torque applications (pumps/fans/compressors). It can be used in constant torque applications with low dynamics to reduce motor noise.

# DIGIDRIVE
## Variable speed drive

**33** : **Selection of flying restart**
Adjustment range : 0 to 3
Factory setting : 0
If this parameter is enabled (33 = 1 to 3), when there is a run command or after a mains supply break, the drive executes a procedure to calculate the motor frequency and direction of rotation. It will automatically recalibrate the output frequency to the measured value and reaccelerate the motor up to the reference frequency.
**0 : disable flying restart on a motor which is rotating.**
**1:** enable flying restart on a motor rotating clockwise or anti-clockwise.
**2:** enable flying restart on a motor rotating clockwise only.
**3:** enable flying restart on a motor rotating anti-clockwise only.
**CAUTION:**
**If the drive control mode corresponds to "Voltage-frequency ratio"**
**(48 = 2), and if a flying restart is required, autocalibration should be performed (see 38) before configuring the drive in voltage-frequency mode.**

⚠ **• If the load is stationary at the time of the run command or when the mains supply returns, this operation may cause the machine to rotate in both directions before the motor accelerates.**
**• Before enabling this function, check that there is no danger to equipment and personnel.**

**34** : **Control logic polarity**
Adjustment range : OFF or On
Factory setting : On
**OFF:** negative logic, the input is activated when the terminal is at low level (< 9.5 V).
**On: positive logic, the input is activated when the terminal is at high level (> 10.5 V).**
After the control logic has been changed, confirm by pressing the 🔴 key for 1 second (the drive should be locked and the "run" terminals should be open).

---

**35** : **Management of logic commands**
Adjustment range : 0 to 3
Factory setting : 0
This parameter is used to modify the function of terminals 9, 10 and 11.

| 35 | Default setting according to the state of 35 | | | Enable parameter setting of 35 |
|---|---|---|---|---|
| | **Terminal 9** | **Terminal 10** | **Terminal 11** | |
| **0** | **Unlock** | **FWD** | **REV** | Press 🔴 (drive locked or subject to Stop command) |
| 1 | Stop | FWD | REV | |
| 2 | Unlock | Run | Reverse direction | |
| 3 | Stop | Run | Reverse direction | |

**36** : **Assignment of the analogue output**
Adjustment range : Fr, Ld, AdV
Factory setting : Fr
This parameter is used to modify the analogue output source, as follows:
**Fr: Motor frequency**
Eg: 0V --> 0Hz, 10V --> 02.

**Ld:** Motor active current.

$$\text{Output voltage} = \frac{\text{I active}}{1.5 \times \text{I nom. var.}} \times 10$$

Eg: 0V --> 0% $I_{sn}$, 10V --> 150% $I_{sn}$.
**AdV:** User parameters set via serial link. (See section 7.5.2 or 7.5.3).
Press 🔴 for 1 second to confirm the setting.

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# DIGIDRIVE
## Variable speed drive

**37** **: Switching frequency**
Adjustment range : 3 Hz
　　　　　　　　 6 kHz
　　　　　　　　 12 kHz
Factory setting　 : 6 kHz
Sets the PWM switching frequency.
**CAUTION:**
**• If the temperature of the heatsink or the IGBTs is too high, the drive automatically reduces the switching frequency.**
**• A high switching frequency reduces the magnetic noise, however it increases the motor temperature rise and the level of radio frequency interference emission, and reduces the starting torque.**

**38** **: Selection of autocalibration**
Adjustment range : 0 to 2
Factory setting　 : 0
**0: no autocalibration**
**1:** measurement of the motor characteristics at standstill (stator resistance and voltage offset).
**Procedure:**
- Check that the motor parameters have been programmed (see section 4.7.2).
- Unlock the drive (close terminal 9).
- Give a jog command (close then open terminal 11 or 12). The right-hand display indicates "Auto" and "tunE" alternately. Wait for the display to stabilise on "0.0".
The motor is then ready to operate normally.
Parameter **38** returns to 0 as soon as autocalibration has been completed.
**CAUTION:**
**This autocalibration is performed automatically even though 38 = 0, in the following cases:**
**- initial commissioning of the drive**
**- return to factory settings, after the drive has been unlocked (terminal 9 closed) and a run command given.**

**2:** measurement of the motor characteristics during rotation (stator resistance, voltage offset, magnetising current, leakage inductance and power factor). This mode gives optimum performance levels.
**Procedure:**
- Check that the motor parameters have been programmed (see section 4.7.2).
- Unlock the drive (close terminal 9).
- Give a jog command (close then open terminal 11 or 12).
The motor performs one FWD rotation (even if a REV command has been given), then stops. During autocalibration, the right-hand display indicates "Auto" and "tunE" alternately. Wait for the display to stabilise on "0.0". The motor is then ready to operate normally.
Parameter **38** returns to 0 as soon as autocalibration has been completed.

⚠ **• Measurements taken when 38 = 2 must be performed with the motor uncoupled as the drive drives the motor at 2/3 its rated speed.**
**Check that this operation does not present any safety risks, and ensure that the motor is stopped before the autocalibration procedure.**
**• After modifying the motor parameters, repeat autocalibration.**

**39** **: Motor rated frequency**
Adjustment range : 0 to 1000.0 Hz
Factory setting　 : **Eur = 50.0 Hz**
　　　　　　　　　　 USA = 60.0 Hz
This is the point at which motor operation changes from constant torque to constant power.
During standard operation, it is the frequency indicated on the motor nameplate.

# DIGIDRIVE
# Variable speed drive

**40** : **Number of motor poles**
Adjustment range : Auto, 2P, 4P, 6P, 8P
Factory setting : Auto
**Auto: the drive automatically calculates the number of poles according to the rated speed (07) and the rated frequency (39).**
**2P:** 2-pole motor (3000 min$^{-1}$).
**4P:** 4-pole motor (1500 min$^{-1}$).
**6P:** 6-pole motor (1000 min$^{-1}$).
**8P:** 8-pole motor (750 min$^{-1}$).

**41** : **Serial link mode**
Adjustment range : AnSI, rtu, FbuS
Factory setting : AnSI
This is the operating mode for the serial port.
**AnSI: 2-wire "half duplex" serial link ANSI protocol.**
**rtu:** Modbus RTU protocol.
**FbUS:** used when a fieldbus interface is installed. 42 "Transmission speed" is then automatically set at 19200 bauds.

**42** : **Transmission speed via serial link**
Adjustment range : 2.4 - 4.8 - 9.6 - 19.2
Factory setting : 4.8
Used to select the data transfer speed.
**2.4:** 2400 bauds.
**4.8 : 4800 bauds.**
**9.6:** 9600 bauds.
**19.2:** 19200 bauds.

**43** : **Serial link address**
Adjustment range : 0 to 24.7
Factory setting : 1.1
Used for ANSI communication to define the drive address. Any value containing a zero should be avoided as these values are used to address groups of drives.

**44** : **Software version**
Adjustment range : 1.00 to 99.99
Indicates the first 2 numbers of the software version installed in the drive.

**45** : **Station address**
Adjustment range : 0 to 255
Factory setting : 0
When a fieldbus (DIGIDRIVE option) is being used, set the station address.

**46** : **Fieldbus transmission speed**
Adjustment range : 0 to 9
Factory setting : 0
When a fieldbus (DIGIDRIVE option) is being used, set the fieldbus transmission speed.

**47** : **Fieldbus diagnostics**
Adjustment range : ± 9999
Factory setting : 0
When a fieldbus (DIGIDRIVE option) is being used, set the fieldbus diagnostics.

# DIGIDRIVE
## Variable speed drive

### ⟦48⟧ : Control mode
Adjustment range : 0 to 3
Factory setting : 3 then 1
Modes 0, 1 or 3 are used in flux vector control mode. Mode 2 corresponds to U/f control with a fixed boost.
**CAUTION:**
**• For modification of this parameter to be taken into account, the drive must be locked or faulty.**

**0 :** Open loop flux vector mode with autocalibration without rotation.
The stator resistance and voltage offset are measured each time the drive receives a run command. If the autocalibration procedure fails, see parameter 38 "Selection of autocalibration".
These measurements are only valid if the motor is stopped, and totally defluxed. No measurement is taken if the run command is given less than 2 seconds after the previous stop (the resistance and offset values for the previous measurement are then taken into account).
This is the most effective flux vector control mode. However, the operating cycle should be compatible with the 2 seconds required between a stop command and a new run command.
**1 : Open loop flux vector mode without autocalibration.**
**The stator resistance and voltage offset are not measured.**
**This mode is of course the least effective: it should only be used when mode 0 is incompatible with the operating cycle. If necessary, during commissioning, autocalibration should be performed (38 = 1 for autocalibration without rotation or 38 = 2 for autocalibration with rotation).**

**2 :** Voltage-frequency ratio with adjustable fixed boost
The boost can be adjusted at parameter 49.
**CAUTION:**
**• Use this mode to control several motors.**
**• If the application requires a flying restart (see 33), perform autocalibration (see 38), before modifying the control mode 48 = 2 (if not, the drive may trip on an "OU" or "OIAC") fault.**
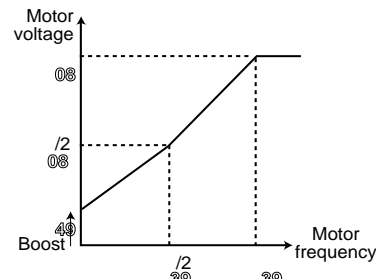


**3 : Open loop flux vector mode with autocalibration without rotation on initial starting.**
**The stator resistance and voltage offset are measured the first time the drive receives a run command, or after a return to factory settings. Then, 48 automatically reverts to 1.**
**If the autocalibration procedure fails, see parameter 38 "Selection of autocalibration".**

### ⟦49⟧ : Boost
Adjustment range : 0 to 25.0% of motor $U_n$
Factory setting : 3.0% motor $U_n$
For operation in U/f mode (48 set at 2), parameter 49 is used to overflux the motor at low speed so that it delivers more torque on starting. It is a percentage of the rated motor voltage ($U_n$).

50 | **: Assignment of terminal 13 to management of the PTC sensors**

Adjustment range : On, OFF
Factory setting : OFF
**OFF: terminal 13 is configured as a logic input, in accordance with the setting of parameter 05 "reference selection".**
**On:** terminal 13 is configured to manage the motor sensor.
After modifying the parameter, press the Reset key ◉ .
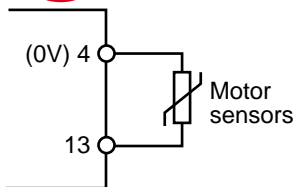


Drive fault threshold = resistance $\geq 3$ k$\Omega$ (the drive is no longer faulty when the threshold reaches 1.8 k$\Omega$).

**CAUTION:**
**• Regardless of which control logic is selected (positive or negative), connect the sensor to terminal 13 and terminal 1 or 4 (0V).**
**• The PTO sensor can also be used.**
**• For modification of this parameter to be taken into account, the drive must be locked or faulty.**

## 4.9 - Factory settings for 60Hz mains supply

The DIGIDRIVE offers the option of configuring the factory settings for a 50Hz or 60Hz mains supply (procedure described in section 4.5).
The parameters modified after returning to the 60Hz factory settings (29 = USA or br.US), and their values are described in the following table.

| Parameter | Name | 60Hz factory setting |
|-----------|------|----------------------|
| 02 | Maximum frequency limit | 60Hz |
| 05 | Frequency reference | PAd |
| 07 | Rated motor speed | 1800 min$^{-1}$ |
| 08 | Rated motor voltage | 230V or 460V |
| 39 | Rated frequency | 60Hz |

# DIGIDRIVE
## Variable speed drive

### 4.10 - "Brake control" preset configuration

#### 4.10.1 - Introduction

The DIGIDRIVE factory configuration is usually suitable for the type of operation required by the installation. However, in order to simplify drive parameter setting in the case of operation with brake, a preset configuration can be selected by setting 29 to "br.Eu" (for 50Hz mains) or "br.US" (for 60Hz mains), then pressing the ⏻ "Reset" key.

The drive then automatically adapts the remote control terminal block, by modifying the factory setting of certain parameters and adding the special parameters 51 to 54 in level 2 of the keypad (10 = L2).

#### 4.10.2 - Operating principle

• A brake release command is issued if the drive is not faulty, if the output frequency is above the threshold set in 51 and if the output current is above the threshold set in 52 + (53/2).

When all the conditions are met, brake release is delayed by the value of the time delay set in 54.

• A brake engage command is issued when the drive becomes faulty or when the output frequency drops below the threshold set in 51 or when the output current is below the threshold set in 52 - (53/2).

⚠ **• Since this configuration prevents some of the safety functions inherent to hoisting operations, it should be reserved for horizontal movements or hoisting movements where there is no risk of danger for people or equipment.**
**• The fault relay should be wired in series with the brake release relay, so that the brake engages when the drive becomes faulty.**

**CAUTION:**
**If the direction of rotation is reversed, this configuration causes the brake to be engaged between + (value of 51) Hz and - (value of 51) Hz.**

### 4.10.3 - List of parameters in the "brake control configuration"

| Parameter | Name | Addres | Type | Adjustment range | Factory |
|---|---|---|---|---|---|
| 01 to 50 | Parameters identical to the standard factory setting | | | | |
| 51 | Zero frequency threshold | 3.05 | R - W | 0 to 20.0 Hz | 1.0 Hz |
| 52 | Threshold adjustment | 12.04 | R - W | 0 to 100.0% | 0 |
| 53 | Threshold hysteresis | 12.05 | R - W | 0 to 25.0% | 0 |
| 54 | Time delay | 9.09 | R - W | 0 to 25.0 s | 0 |

### 4.10.4 - Explanation of parameters specific to the "brake control configuration"

**51 : Zero frequency threshold**
Adjustment range : 0 to 20.0 Hz
Factory setting : 1.0 Hz
Used to define a threshold below which the frequency is considered to be zero.

**52 : Threshold adjustment**
Adjustment range : 0 to 100.0%
Factory setting : 0
Used to set the motor current threshold.

**53 : Threshold hysteresis**
Adjustment range : 0 to 25.0%
Factory setting : 0
Used to set the level of the hysteresis on the motor current.

**54 : Time delay**
Adjustment range : 0 to 25.0 s
Factory setting : 0
Used to set the time between detection of non-zero frequency and brake release.

## 5 - FAULTS - DIAGNOSTICS

### 5.1 - Error messages

When the DIGIDRIVE detects a fault, the left-hand display indicates "tr", while the right-hand display indicates one of the codes listed in the following table:

After consulting the fault table, proceed as follows:

- Carry out the necessary checks in order to eliminate the cause of the fault.
- Check that the drive is locked (terminal 9 open).
- Press the ⭕ key: if the drive is no longer faulty, the left-hand display indicates "ih".
- To restart the motor, unlock the drive by closing terminal 9, and open and then reclose terminal 10 for Run forward operation or terminal 11 for Run reverse operation.

⚠ • **Opening and then closing the unlock terminal may clear the fault. If the FWD or REV terminal is closed at the time of clearing the fault, the motor will start immediately.**

| No. | Display mnemonic | Reason for fault | Points to check | Solution |
|---|---|---|---|---|
| 1 | UU | DC bus undervoltage (<180VDC for "M", "TL", or "M/TL" types; < 400 VDC for "T" types) | • Power supply terminals L1, L2, L3 mains supply overvoltage | • Check the mains supply<br>• Check the power components |
| 2 | OU | DC bus overvoltage (>420VDC for "M", "TL" or "M/TL" types; > 830VDC for "T" types) | • Deceleration too fast (inertial load)<br>• Terminals L1, L2, L3 mains supply overvoltage | • Program a longer deceleration time in ④<br>• Check the deceleration mode in ㉚<br>• Use a braking resistor (optional)<br>• Check the mains supply |
| 3 | OI.AC | Overcurrent at drive output | • Power terminal block U, V, W<br>• Wiring | • Eliminate the short-circuit at the drive output<br>• Program a longer acceleration time in ③<br>• If the motor and/or the motor connections have been changed, repeat autocalibration (see ㊳)<br>• Wait at least 10 seconds before resetting the drive |
| 4 | OI.br | Overcurrent in braking transistors | • Power terminal blocks (+, DBR or •, -)<br>• Value of the braking resistor | • Wait 10 seconds before reinitialising the drive<br>• Eliminate the short-circuit at the resistor output<br>• Set a higher ohmic resistance |

# DIGIDRIVE
# Variable speed drive

| No. | Display mnemonic | Reason for fault | Points to check | Solution |
|---|---|---|---|---|
| 6 | Et | External trip | • External trip terminal (if 10.32 is assigned to a logic input. See manual ref. 3299) | • Check that the terminal is connected to the +24V (in positive logic) or to the 0V (in negative logic) |
| 7 | O.SP | Overspeed | • Motor speed higher than overspeed threshold | • Check that the load is not driving<br>• The drive goes into overspeed when it reaches the threshold: value of 02 + 20% |
| 18 | tunE | • Autocalibration fault<br>• Autocalibration interrupted | • Motor power supply | • Check that the motor is operating at no load during autocalibration<br>• Check the drive/motor power supply |
| 19 | It.br | Braking resistor overload I x t | • Braking resistor<br>• Braking resistor wiring<br>• Integral braking resistor<br>• Braking cycle too long | • Increase the ohmic value<br>• Increase the braking cycle 10.31 or modify the maximum braking time 10.30 (see manual ref. 3299) |
| 20 | It. AC | Motor overload I x t | • Motor load<br>• Setting of motor In | • High impedance between phases or phase/earth short-circuit at the drive output<br>• If the motor and/or the motor connections have been changed, repeat autocalibration (see 38)<br>• Check that the motor is not overloaded<br>• Check that the rated current 06 and the rated motor frequency 39 are set correctly |
| 21 | Oht1 | Thermal simulation of the heatsink according to I x t (temperature ≥100°C) | • Setting of motor In | • Decrease the motor load<br>• Shorten the cycle |

# DIGIDRIVE
## Variable speed drive

| No. | Display mnemonic | Reason for fault | Points to check | Solution |
|---|---|---|---|---|
| 22 | Oht2 | Heatsink overheating detected by thermal sensor (> 100°C for 16T and 22T, > 95°C for other ratings) | • Cooling fan (for those fitted with one) <br> • Ambient temperature | • Check that: <br> - the fans are rotating <br> - the cooling intakes are not obstructed <br> - the ambient temperature is less than 50°C <br> - the space around the drive is sufficient <br> • Reduce the switching frequency 37 |
| 24 | th | Tripping of the motor thermal sensor | • Terminal 13 | • Check the motor load <br> • Reduce the level of overload <br> • Check the motor ventilation and the ambient temperature <br> • Check the sensor wiring |
| 26 | O.Ld1 | Overload on the +24V power supply or logic output | • Terminal 7: +24V <br> • Terminal 4: 0V | • Check the load circuit of the +24V, and also the logic output **CAUTION: When the checks have been completed, this fault can only be cleared by pressing** ⊙ . |
| 28 | cL | Loss of the current reference on A2 analogue input (terminal 5) | • 4-20mA or 20-4mA current reference level | • Check that the current reference is > 3mA (if 16 = 4-20 or 20-4) |
| 30 | SCL | Serial link problem | | • Check the connection of the serial link. |
| 31 | EEF | EEPROM fault | • Control card | • Switch off and then on again <br> • If the fault persists, consult LEROY-SOMER |
| 32 | PH | Phase loss | • Power supply terminals L1, L2, L3 | • Check the mains supply (this fault does not exist on the M/TL versions). |
| 33 | rS | Fault during measurement of the stator resistance | • Concordance of the motor power with the drive power <br> • Motor connection | • Adapt the drive power to the motor power <br> • Check the motor connections |
| 40 to 99 | tr xx | User-specific faults with the serial link | • Check the user fault parameter 10.38 (see manual ref. 3299) | |

LEROY SOMER

# DIGIDRIVE
## Variable speed drive

| No. | Display mnemonic | Reason for fault | Points to check | Solution |
|---|---|---|---|---|
| 180 | F.bus | Disconnection of the fieldbus during operation | • Serial link | |
| 182 | C.Err | The content of the copy key memory is inconsistent | - | - |
| 183 | C.dat | The copy key memory is empty | - | - |
| 185 | C.Acc | Access to storage of parameters in the copy key has not been enabled | - | - |
| 186 | C.rtg | The drive rating is different to that stored in the copy key | | • The parameters connected with the drive rating have not been transferred, and must be set after clearing the fault using the ⬤ key |
| 188 | O.Ld2 | Overload on the +24V power supply | • RJ45 connector<br>• Terminals 7 and 14 | • Check that the power supply is not drawing more than 110mA<br>• Check that there is no short-circuit. |
| 189 | O.cL | Overload on the A2 current analogue input | • Current reference level | • Check that the current reference is < 25mA |

## 5.2 - Alarm messages

Alarms may appear during drive operation. The alarm message flashes alternately with the parameter value on the right-hand display.

Example:
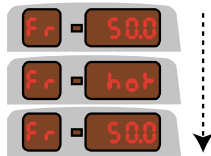


These alarms are for information only, in order to warn the user: the drive continues to operate but may switch to fault mode if no corrective action is taken.

| OVL | Motor overload I x t |
|------|------------------------|
| Hot | Heatsink overheating (≥ 95°C) |
| br.rS | Braking resistor overload |

## 5.3 - HFxx error messages

These error codes represent internal drive faults. In order to correct the fault, switch the drive off then on again. If the fault remains, contact the supplier of the equipment.

The left-hand display indicates "HF", while the right-hand display indicates one of the codes listed in the following table:

| "HF" fault no. | Reason for fault |
|----------------|------------------|
| 01 | Preloading relay fault |
| 02 | Current feedback failure |
| 03 | Fan not operating |
| 70 | An internal operation has not been executed |
| 71 | An internal operation has not been executed |
| 72 | An internal operation has not been executed |
| 73 | Internal serial link failure |
| 74 | An internal operation has not been executed |
| 83 | Incorrect power board code |
| 88 | An internal operation has not been executed |
| 90 | An internal operation has not been executed |
| 91 | An internal operation has not been executed |
| 92 | An internal operation has not been executed |
| 98 | An internal operation has not been executed |

**CAUTION:**
**When the drive has an "HF" fault, the fault relay (terminals 15 and 16) is open and the serial link is no longer active.**

# DIGIDRIVE
## Variable speed drive

## 6 - MAINTENANCE

### 6.1 - Introduction and warning

⚠ **• All work relating to installation, commissioning and maintenance must be carried out by experienced and qualified personnel.**

**• When a fault detected by the drive causes it to switch off, fatal residual voltages remain at the output terminals and in the drive.**

**• Before carrying out any work, disconnect and lock the drive power supply and wait 10 minutes to make sure that the capacitors have discharged.**

**• Check that the DC bus voltage is below 40V before carrying out any work.**

**•During maintenance operations performed with the drive switched on, the operator must stand on an insulated surface which is not connected to earth.**

**• During work on a motor or its power supply cables, check that the power supply of the corresponding drive is disconnected and locked.**

**• All protective covers must remain in place during tests.**

There are very few maintenance and repair operations on DIGIDRIVE drives to be performed by the user. Regular servicing operations and simple methods for checking that the drive is operating correctly are described below.

### 6.2 - Care

Problems may occur on any drive following exposure to too high a temperature, humidity, oil, dust, or after penetration of any external matter.

Printed circuits and their components do not normally require any maintenance. Contact your vendor or the nearest approved repair company in the event of a problem.

After storage for a period of 12 months, the drive must be switched on for 24 hours, and this operation repeated every 6 months thereafter.

**DO NOT DISMANTLE THE PRINTED CIRCUITS WHILE THE DRIVE IS STILL UNDER WARRANTY, AS THIS WOULD THEN IMMEDIATELY BECOME NULL AND VOID.**

Do not touch the integrated circuits or the microprocessor either with your fingers or with materials which are charged or live. Earth yourself, as well as the workbench or the soldering iron, when performing any work on the circuits.

From time to time, check that the power connections are correctly tightened.

## 6.3 - Voltage, current and power measurements

### 6.3.1 - Measuring the voltage at the drive output

The harmonics generated by the drive mean that it is not possible to take a correct measurement of the voltage at the motor input using a conventional type of voltmeter. However it is possible to obtain an approximate value of the rms voltage of the fundamental wave (that which affects the torque) using a conventional voltmeter connected as shown in the diagram below.



C : capacitor 0.1μF
       400 VAC (1000V peak).
R : resistor 1 kΩ, 5W.
V : AC voltmeter
       impedance ≥ 1000Ω/V.
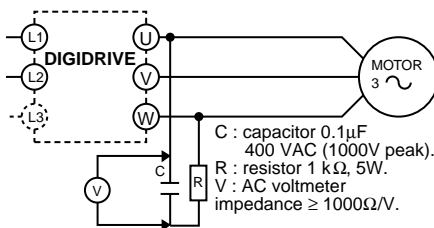
### 6.3.2 - Measuring the motor current

The current drawn by the motor and the drive input current can be measured approximately using a conventional moving coil ammeter.

### 6.3.3 - Measuring the drive input and output power

The drive input and output power can be measured using an electrodynamic instrument.

## 6.4 - Spare parts list

Please consult LEROY-SOMER.

## 6.5 - Exchanging products
**CAUTION:**

**Products must be returned in their original packaging or, if this is not possible, in similar packaging, to prevent their being damaged. Otherwise, replacement under warranty could be refused.**

# DIGIDRIVE
# Variable speed drive

**Notes**

# DIGIDRIVE
## Variable speed drive

## 7 - OPERATING EXTENSIONS

### 7.1 - Type 1 mains filters

#### 7.1.1 - Characteristics

Mains filters are used to reduce the drive electromagnetic emissions, and thus comply with European standards EN 50081-1 and EN 50081-2 (see section 3.5).

**CAUTION:**
**Use one mains filter for each drive.**

| DIGIDRIVE rating | Characteristics | | | | | | |
|---|---|---|---|---|---|---|---|
| | Voltage (V) | Filter reference | Rated current (A) | Max. length of motor cables (m) | Energy losses (W) | Maximum leakage current (mA) | Protection |
| 0.5M to 1.5M | 240 1-ph | FLT 5594-12 | 12 | 20 | 6 | 4 | IP20 |
| 1.5M/TL to 3.5M/TL | 240 1-ph | FLT 5594-26 | 26 | 50 | 6 | 29.5 | IP20 |
| | 240 3-ph | FLT 5901-17 | 17.1 | 15 | 6 | 33 | IP20 |
| 5.5TL | 240 3-ph | FLT 5901-30 | 30.5 | 20 | 11 | 14.1 | IP20 |
| 1.5T to 5.5T | 480 3-ph | FLT 5901-17 | 17.1 | 15 | 6 | 33 | IP20 |
| 8TL and 11 TL | 240 3-ph | FLT 5901-30 | 30.5 | 15 | 11 | 14.1 | IP20 |
| 8T and 11T | 480 3-ph | FLT 5901-17 | 17.1 | 15 | 6 | 33 | IP20 |
| 16T and 22T | 480 3-ph | FLT 5901-33 | 33 | 15 | 12 | 14.1 | IP20 |
| 27T | 480 3-ph | FLT 5901-37 | 37 | 20 | 16 | 24.5 | IP20 |

**Note:** The filters proposed for the DIGIDRIVE are UL approved.

# DIGIDRIVE
## Variable speed drive

### 7.1.2 - Dimensions and weight

**FLT 5594 - 12**

**FLT 5594 - 26 and FLT 5901 - 17**

**FLT 5901 - 30 and FLT 5901 - 33**
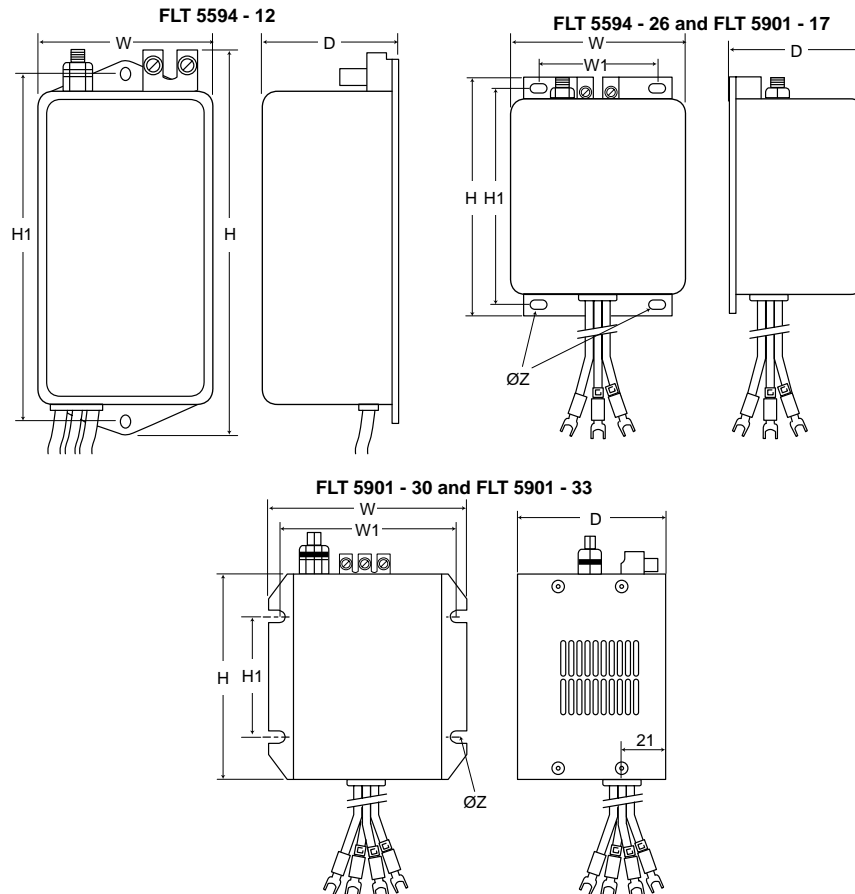
The filters should be mounted on a plate at the back of the cabinet, as close as possible to the drive.

| Filter reference | Width (mm) | | Height (mm) | | Depth (mm) | Cable length (mm) | Screws (mm) | Terminal tightening torque (Nm) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| | W | W1 | H | H1 | D | | ØZ | | |
| FLT 5594-12 | 58 | - | 113.5 | 103 | 45.5 | 230 | 4.4 | 0.8 | 0.5 |
| FLT 5594-26 | 85.5 | 51 | 119 | 109 | 57.6 | 250 | 4.3 | 0.8 | 0.7 |
| FLT 5901-17 | 85.5 | 51 | 119 | 109 | 57.6 | 300 | 4.3 | 0.8 | 0.6 |
| FLT 5901-30 | 118 | 103 | 133 | 80 | 70 | 300 | 6.5 | 0.8 | 0.8 |
| FLT 5901-33 | 128 | 113 | 143 | 80 | 80 | 300 | 6.5 | 2.2 | 1.1 |
| FLT 5901-37 | 128 | 113 | 143 | 80 | 80 | 300 | 6.5 | 2.2 | 1.2 |

# DIGIDRIVE
## Variable speed drive

### 7.2 - Type 2 mains filters

#### 7.2.1 - Characteristics

Mains filters are used to reduce the drive electromagnetic emissions, and thus comply with European standards EN 50081-1 and EN 50081-2 (see section 3.5).

**CAUTION:**
**Use one mains filter for each drive.**

| DIGIDRIVE rating | Characteristics | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Voltage (V) | Filter reference | Rated current (A) | Max. length of motor cables (m) | Energy losses (W) | Maximum leakage current (mA) | Protection |
| 0.5M to 1.5M | 240 1-ph | FLT 5581-12 | 12 | 75 | 6 | 40.7 | IP20 |
| 1.5M/TL to 3.5M/TL | 240 1-ph | FLT 5581-26 | 26 | 100 | 10 | 89 | IP20 |
| | 240 3-ph | FLT 5569-16 | 16 | 100 | 10 | 45.7 | IP20 |
| 5.5TL | 240 3-ph | FLT 5569-26 | 26 | 100 | 15 | 26.4 | IP20 |
| 1.5T to 5.5T | 480 3-ph | FLT 5569-16 | 16 | 100 | 10 | 45.7 | IP20 |
| 8TL and 11 TL | 240 3-ph | FLT 5569-30 | 30.5 | 100 | 20 | 26.4 | IP20 |
| 8T and 11T | 480 3-ph | FLT 5569-17 | 17.1 | 100 | 12 | 45.7 | IP20 |
| 16T and 22T | 480 3-ph | FLT 5569-33 | 33 | 100 | 26 | 29.4 | IP20 |
| 27T | 480 3-ph | FLT 5569-37 | 37 | 100 | 30 | 38 | IP20 |
| 33T | 480 3-ph | FLT 5113-50 | 50 | 100 | 13 | 31 | IP20 |
| 40T | 480 3-ph | FLT 5113-63 | 63 | 100 | 14 | 29 | IP20 |
| 50T | 480 3-ph | FLT 5113-100 | 100 | 100 | 26 | 48.5 | IP20 |

**Note:** The filters proposed for the DIGIDRIVE are UL approved.

### 7.2.2 - Dimensions and weight

**FLT 5581-12 to FLT 5569-33**　　　　　　**FLT 5113-50 to FLT 5113-100**
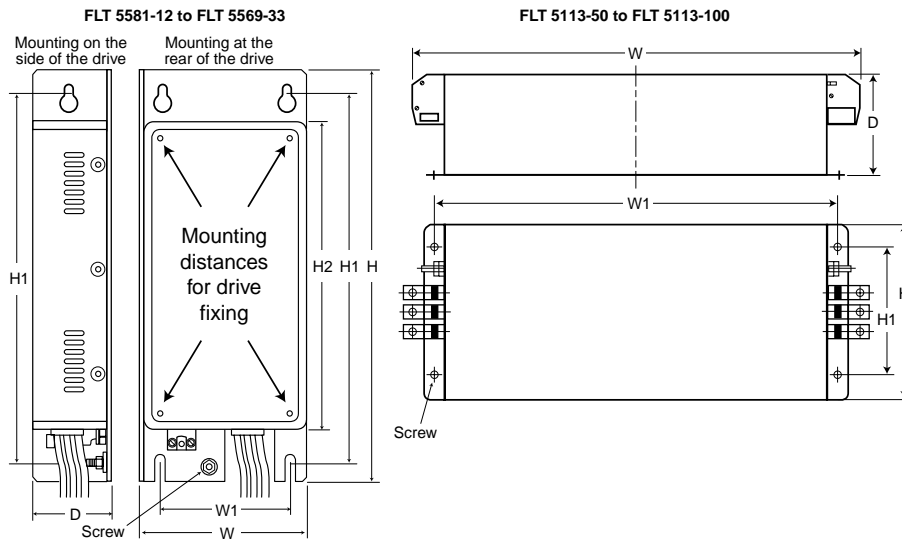


Depending on the general layout, the filters can be mounted at the back or on the side of the drive.

| Filter | Width | | Height | | | Depth | Length of cables | Screws | Terminal tightening torque | Earth tightening torque | Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|
| reference | (mm) | | (mm) | | | (mm) | (mm) | | (Nm) | (Nm) | (kg) |
| | W | W1 | H | H1 | H2 | D | | | | | |
| FLT 5581-12 | 100 | 80 | 242 | 225 | 195 | 40 | 190 | M4 | 0.8 | | 0.6 |
| FLT 5581-26 | 148 | 122 | 330 | 313 | 281 | 45 | 250 | M5 | 0.8 | | 1.2 |
| FLT 5569-16 | 148 | 122 | 330 | 313 | 281 | 45 | 250 | M5 | 0.8 | | 1.1 |
| FLT 5569-17 | 190 | 164 | 385 | 368 | 336 | 50 | 270 | M5 | 0.8 | | 1.6 |
| FLT 5569-26 | 148 | 122 | 330 | 313 | 281 | 45 | 250 | M5 | 0.8 | | 1.3 |
| FLT 5569-30 | 190 | 164 | 385 | 368 | 336 | 50 | 270 | M5 | 0.8 | | 1.7 |
| FLT 5569-33 | 246 | 215 | 467 | 448 | 414 | 55 | 320 | M5 | 2.2 | | 3.1 |
| FLT 5569-37 | 246 | 215 | 467 | 448 | 414 | 60 | 320 | M5 | 2.2 | | 3.1 |
| FLT 5113-50 | 337 | 275 | 90 | 80 | - | 100 | - | M7 | 4.5 | 2.2 | 3.8 |
| FLT 5113-63 | 377 | 315 | 150 | 105 | - | 103 | - | M7 | 4.5 | 4 | 3.8 |
| FLT 5113-100 | 380 | 310 | 150 | 105 | - | 107 | - | M7 | 8 | 9 | 7.8 |

# DIGIDRIVE
## Variable speed drive

## 7.3 - RF braking resistor for 1.5M/TL to 50T ratings

⚠ **• The braking resistor must be installed in such a way that it does not damage neighbouring components by its heat dissipation.**

**• Special care must be taken when carrying out any work near the resistor, as there is high voltage present and heat is given off.**

**• The braking resistor must be wired in series via a thermal relay calibrated to the rms current of the resistor to prevent the risk of fire which may result from a braking resistor malfunction or a short-circuit.**

• Its use is optional and depends on the application.
• It dissipates the active power returned by the motor onto the drive DC bus in the event of a driving machine.
• The braking transistor is integrated in the drive.

### 7.3.1 - Electrical characteristics

**CAUTION:**

**In this table, the resistors are suggested by way of example. Other lower power ratings can be selected, while adhering to the minimum ohmic values.**

| DIGIDRIVE rating | Minimum ohmic value ($\Omega$) | Resistor reference | Value ($\Omega$) | Rated power (W) | Peak power (W) | rms current (A) |
|---|---|---|---|---|---|---|
| 1.5M/TL | 50 | RF100M | 100 | 100 | 1440 | 1 |
| 2M/TL | 50 | RF100M | 100 | 100 | 1440 | 1 |
| 2.5M/TL | 50 | RF100M | 100 | 100 | 1440 | 1 |
| 3.5M/TL | 40 | RF320M | 47 | 320 | 3000 | 2.6 |
| 5.5TL | 30 | RF320M | 47 | 320 | 3000 | 2.6 |
| 8TL | 12 | RF3500T | 40 | 3500 | 3800 | 9.35 |
| 11TL | 12 | RF3500T | 40 | 3500 | 3800 | 9.35 |
| 1.5T | 100 | RF320T | 180 | 320 | 3000 | 1.33 |
| 2T | 100 | RF320T | 180 | 320 | 3000 | 1.33 |
| 2.5T | 100 | RF320T | 180 | 320 | 3000 | 1.33 |
| 3.5T | 75 | RF640T | 90 | 640 | 6000 | 2.66 |
| 4.5T | 75 | RF640T | 90 | 640 | 6000 | 2.66 |
| 5.5T | 75 | RF640T | 90 | 640 | 6000 | 2.66 |
| 8T | 39 | RF5500T | 40 | 5500 | 12960 | 11.7 |
| 11T | 39 | RF5500T | 40 | 5500 | 12960 | 11.7 |
| 16T | 24 | RF5500T | 40 | 5500 | 12960 | 11.7 |
| 22T | 24 | RF5500T | 40 | 5500 | 12960 | 11.7 |
| 27T | 24 | RF5500T | 40 | 5500 | 12960 | 11.7 |
| 33T | 10 | RF7500T | 10 | 7500 | 51840 | 27.4 |
| 40T | 10 | RF11000T | 10 | 11000 | 51840 | 33.2 |
| 50T | 10 | RF11000T | 10 | 11000 | 51840 | 33.2 |

LEROY SOMER

# DIGIDRIVE
## Variable speed drive

### 7.3.2 - Mechanical characteristics

**RF 100M and 140M**

**RF 320M to RF 3500T**

**RF 5500T to 11000T**
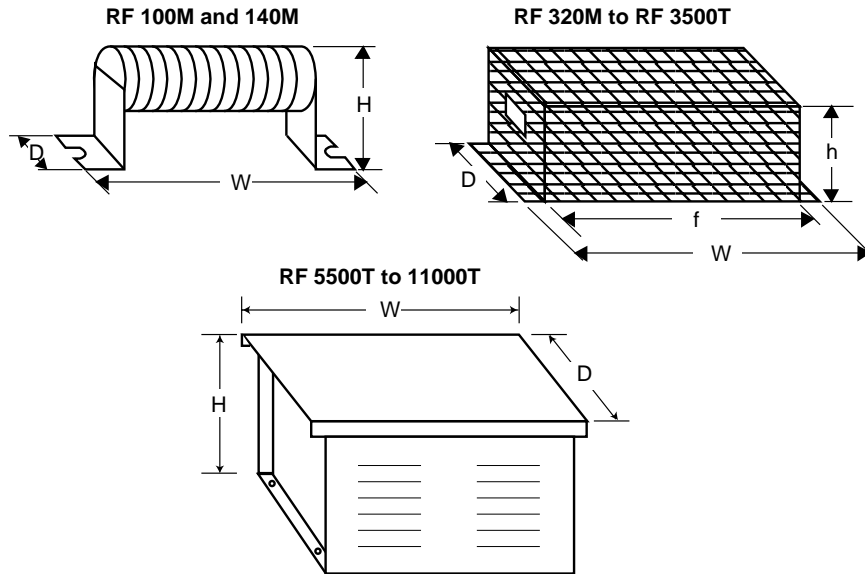
| RF | Weight (kg) | Dimensions (W x D x H) (mm) | Mounting distance f (mm) |
|---|---|---|---|
| 100M | 0.14 | 182.5 x 25 x 50 | - |
| 140M | | | |
| 320M | 1.5 | 425 x 134 x 114 | 395 |
| 320T | | | |
| 640T | 2.1 | | |
| 1000T | 3.6 | 565 x 224 x 180 | 535 |
| 2000T | 5.1 | | |
| 3500T | 7.5 | 565 x 370 x 180 | |
| 5500T | 21 | 420 x 480 x 440 | - |
| 7500T | 25 | 500 x 480 x 440 | - |
| 11000T | 32 | 670 x 480 x 440 | - |

# DIGIDRIVE
## Variable speed drive

### 7.4 - "FLASHKEY" copy key

As it stores a complete set of parameters, the removable copy key can be used to instantly copy the settings from one drive to another (see parameter ②⑧).

**DIGIDRIVE 1**          **DIGIDRIVE 2**

**FLASHKEY**

---
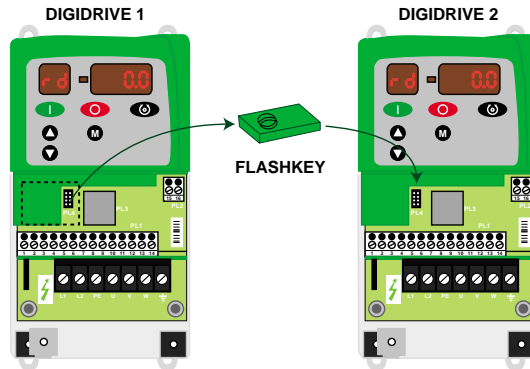
### 7.5 - 3-phase motor chokes for attenuating earth leakage currents: MC choke

These are wired directly on the drive output (terminal U, V, W) and can be used to reduce earth leakage currents and emitted interference.
They are cylindrical in shape and are fixed by a central untapped hole.

| MC choke rating | DIGIDRIVE rating | Dimensions (mm) | | | Weight (kg) |
|---|---|---|---|---|---|
| | | **Diameter** | **Height** | **hole Ø** | |
| 3.5T | 0.5M to 1.5M 1.5M/TL and 2M/TL 1.5T to 3.5T | 80 | 50 | 5.1 | 0.5 |
| 11T | 2.5M/TL and 3.5M/ 4.5T to 11T | 80 | 50 | 5.1 | 0.75 |
| 27T | 5.5TL to 11TL 16T to 27T | 125 | 55 | 6.2 | 1.9 |
| 50T | 33T to 50T | 125 | 65 | 6.2 | 3 |

• Wiring

MC chokes should be wired as close as possible to the drive in accordance with the diagram below.
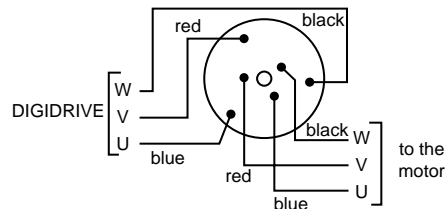


**CAUTION:**
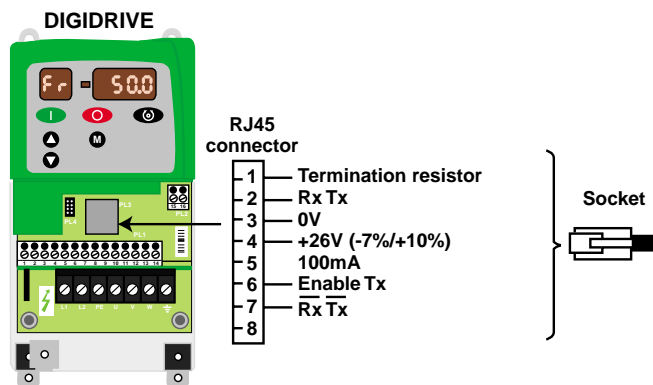**MC chokes are supplied with cables 30 cm long.**

---

## 7.6 - Using the serial link

### 7.6.1 - Characteristics

As standard the DIGIDRIVE has a half duplex RS 485 2-wire serial link which can be used to:
- set the parameters of the drive using a remote terminal
- set the parameters of the drive using a PC via an RS 232/RS 485 interface
- connect 1 or more drives to an ANSI network

The RS 485 serial link is connected to the drive by means of an RJ45 connector, as shown below. Simply insert the connector into the drive female RJ45 socket.

**DIGIDRIVE**

**RJ45 connector**

| 1 | Termination resistor |
| 2 | Rx Tx |
| 3 | 0V |
| 4 | +26V (-7%/+10%) |
| 5 | 100mA |
| 6 | Enable Tx |
| 7 | $\overline{Rx}$ $\overline{Tx}$ |
| 8 | |

**Socket**

### 7.6.2 - Setting the parameters via a remote console

The "UNIPAD" console provides access to all the drive parameters in text format, via a 32-character alphanumeric display.

As well as having the same keys as on the drive keypad, it provides the option of setting parameters for 3 function keys, thus enabling the operator to communicate rapidly with the drive.
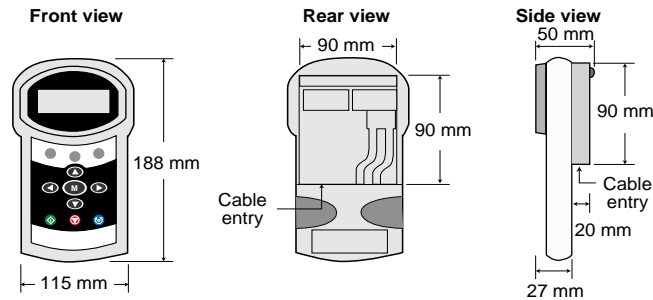
# DIGIDRIVE
# Variable speed drive

## General characteristics

| Power supply | Provided by the DIGIDRIVE |
|---|---|
| Serial link | 2-wire RS 485 Connected to the DIGIDRIVE via the RJ45 socket (maximum cable length: 1200 m) |
| Ambient temperature | 0 to +50°C |
| EMC | Conforms to standards EN 50081-2 (emissions), EN 50082-2 (immunity) and IEC 61800-3 (variable speed drives) |
| Protection | IP40 (when the console is installed on the front of the cabinet with a weatherproof seal, the protection is IP65) |

## Dimensions

**Front view**   **Rear view**   **Side view**

188 mm

115 mm

90 mm

90 mm

Cable entry

50 mm

90 mm

Cable entry

20 mm

27 mm

For information on how to connect and operate the UNIPAD, see manual ref. 3343.

### 7.6.3 - Setting the parameters via a PC

The DIGISOFT parameter-setting software makes it very easy to set up the DIGIDRIVE from a PC.

Interactive parameter setting: the parameters of the drive are set automatically, based on the answers to a questionnaire concerning the installation.

Supervision during commissioning: DIGISOFT enables the user to supervise the various data concerning operation from a single screen.

Storing files: DIGISOFT can be used to save all the parameter files, thus making it possible to copy an existing setting quickly.

### Composition of the DIGISOFT kit:

1 CD-Rom, 1 connection lead consisting of:
- 1 RS 232 SUB D 9-pin connector for linking to the PC
- 1 x 2 m cable incorporating an RS 232/RS 485 interface
- 1 RS 485 RJ45 connector for connection to the drive
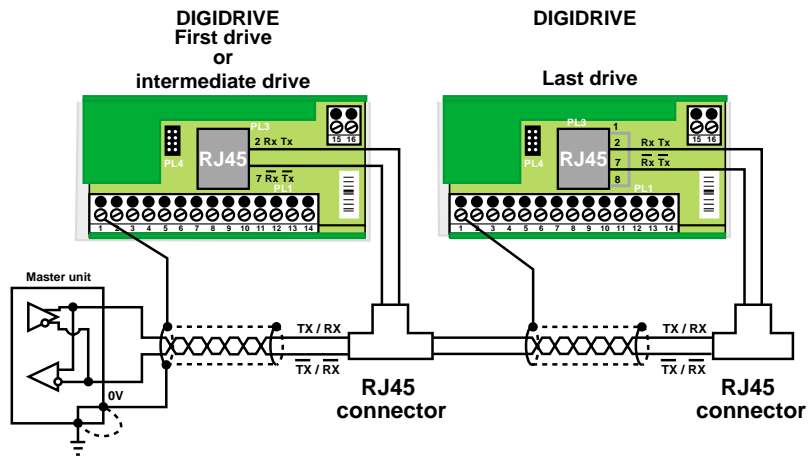
# DIGIDRIVE
## Variable speed drive

**7.6.4 - Networking**

⚠ **•The drive RS 485 serial link is not isolated from the other circuits and is only separated by single insulation.**

**If it is necessary for the serial link to be accessible to personnel, an isolation circuit must be used. If there are multiple RS 485 networks, each network must have its own isolation circuit.**

The cable used for the serial link must be shielded.

For networking several DIGIDRIVEs, follow the connection diagram below.



For information on how to connect the RJ45 connector on the DIGIDRIVE, see section 7.6.1.

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### 7.7 - Optional "PM10V" bi-directional analogue input

The PM10V option can be used to control a DIGIDRIVE using a ±10V bi-directional analogue reference, and to have an additional relay.

It can therefore be used to reverse the direction of rotation of a motor by means of the analogue reference, rather than by using the Run FWD, Run REV or Reverse direction of drive operation terminals. The PM10V option can be integrated in the entire DIGIDRIVE range.
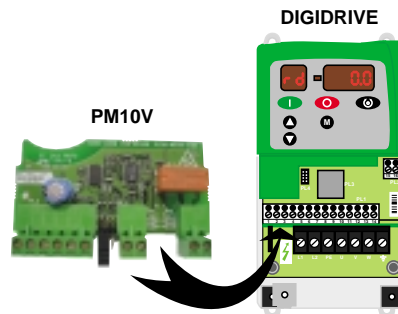


**• Description of the terminal blocks**

The PM10V option is equipped with 3 removable terminal blocks (PL1, PL2 and PL3) as well as 2 jumpers (PL4).
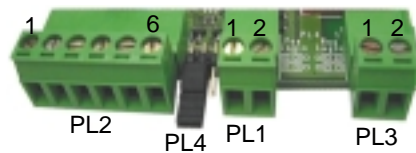


| Term. block | Terminal | Function |
| --- | --- | --- |
| PL1 | 1 | Analogue voltage input (Voltage range: +/-10V)<br>**CAUTION:**<br>**For the potentiometer power supply, the +10V can be supplied by**<br>**terminal 3 of the drive, or by an external power supply. The -10V should**<br>**be supplied by an external power supply.** |
| | 2 | 0V |
| PL2 | 1 | 0V |
| | 2 | Analogue voltage output (Voltage range: 0 to +10V) |
| | 3 | +24V power supply |
| | 4 | "PL3 relay control" logic input |
| | 5 | "Run forward" logic output |
| | 6 | "Run reverse" or "Forward/Reverse" logic output |
| PL3 | 1 | Relay - Common |
| | 2 | Relay - Normally open contact<br>**Operation using factory settings:      Open: Frequency not zero**<br>**Closed: Zero frequency** |
| PL4 | - | Control logic for the PM10V option selected by positioning 2 jumpers<br><br>**Factory setting: positive logic** |

For information on how to connect the PM10V option, see manual ref. 3374.

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### 7.8 - Line chokes

Line chokes can be used to attenuate transient interference from the mains supply which could affect the drive.

**• Characteristics**

| DIGIDRIVE rating | Choke reference | Current (A) | Inductance (mH) |
|---|---|---|---|
| 0.5M to 1.2M | Consult LEROY-SOMER | 4.5 | 16 |
| 1.5M - 1.5M/TL and 2M/TL | Consult LEROY-SOMER | 7.3 | 1 |
| 2M/TL and 3.5M/TL | Consult LEROY-SOMER | 19 | 0.5 |
| 1.5TL to 2.5TL and 1.5T to 3.5T | 9 ST 2.5 | 8.6 | 2.5 |
| 3.5TL and 4.5T to 11T | 16 ST 1.5 | 16 | 1.5 |
| 5.5TL to 11TL and 16T - 22T | 25 ST 1 | 25 | 1 |
| 27T | 38 ST 0.65 | 38 | 0.65 |
| 33T and 40T | 60 ST 0.4 | 60 | 0.4 |
| 50T | 90 ST 0.25 | 90 | 0.25 |

**• Dimensions and weight**

These are given by way of example and may vary depending on the manufacturer
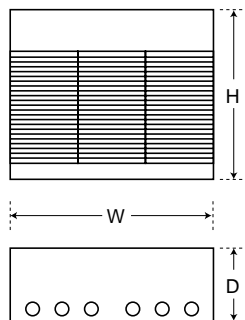


| Choke reference | W (mm) | H (mm) | D (mm) | Weight (kg) |
|---|---|---|---|---|
| 9 ST 2.5 | 140 | 160 | 85 | 1.8 |
| 16 ST 1.5 | 125 | 115 | 95 | 1.8 |
| 25 ST 1 | 155 | 190 | 105 | 5.5 |
| 38 ST 0.65 | 185 | 210 | 110 | 7 |
| 60 ST 0.4 | 220 | 240 | 120 | 11 |
| 90 ST 0.25 | 220 | 240 | 140 | 17 |

| Choke reference | W (mm) | H (mm) | D (mm) | Weight (kg) |
|---|---|---|---|---|
| 4.5A/16mH | 82 | 90 | 85 | |
| 7.3A/1mH | 82 | 100 | 75 | |
| 19A/0.5mH | 82 | 105 | 90 | |

## 7.9 - Using Modbus RTU

**• Parameter setting**

To enable Modbus RTU, set 41 = rtu, and select the transmission speed in 42. Next, set the DIGIDRIVE address in 43.

**• Specification of the Modbus RTU frame**

| 1 Start bit | 8 Data bits | 2 End bits |
| --- | --- | --- |

The DIGIDRIVE does not use the parity bit.

**• Value of the Modbus RTU register**

All the DIGIDRIVE parameters are grouped together in the 4XXXX series of the Modbus registers.

To convert a parameter to a Modbus register, remove the parameter decimal point, for example: parameter 11.22 becomes register 1122. All parameters (including "bit" parameters) are used as signed 16-bit values.

**• Functions**

| 0x03 (3) | Reading multiple parameters |
| --- | --- |
| 0x10 (16) | Writing multiple parameters |
| 0x17 (23) | Reading and writing multiple parameters |

When multiple read or write commands are being used, the written or read parameters should be consecutive. If a block of parameters is written or read from a missing parameter, the slave will respond with an exception code. It should therefore be broken down into a number of small blocks, so that a non-existent parameter is not read or written.

The maximum number of consecutive parameters read or written is 16.

**• "Broadcast" messages**

The DIGIDRIVE can receive "broadcast" messages.

If the master controller sends a WRITE message to node 0, all nodes will take the message into account, but none will respond to the master.

**• Exception code**

The exception codes are as follows:

1 Non-existent function code/incorrect function.

2 Register address outside the range or too many registers requested in read mode/ incorrect data address.

Parameter outside the range during writing of block 0x10:
the slave processes the write block in the order in which the data are received. If a write operation is not correct because a value is outside the range, the write block is ended. However, the slave does not create an exception response, and the error is instead indicated in the return message by the number of written data items.

Parameter outside the range during reading/writing of block 0x17:
no indication that a value is out of range will be given during access to 0x17.

## 7.10 - Fieldbus options

"Fieldbus" options can be integrated in the entire DIGIDRIVE range.
Data is exchanged by means of the drive serial link (RJ45 socket).

| Fieldbus type | DIGIDRIVE option |
|---|---|
| Profibus DP | DIGICOM PB |
| Interbus S | DIGICOM IB |
| Devicenet | DIGICOM DN |
| Can Open | DIGICOM CN |
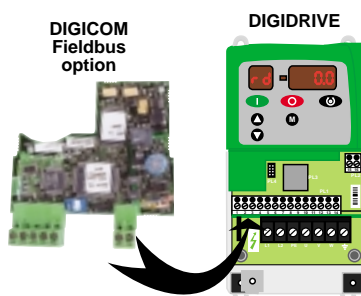


## 7.11 - Additional functions

As well as access to the parameters described in this manual, the UNIPAD console (section 7.6.2) and the DIGISOFT software (section 7.6.3) can be used to extend operation of the DIGIDRIVE by offering additional functions such as:
- special ramps on preset speeds
- torque regulation
- timers and energy meters
- alarms on timer
- reassignment of inputs (logic and analogue outputs)
- AND, OR, comparator and time delay functions
- PID controller
- motor-driven potentiometer
- control of 2 motors with different characteristics, etc.
See the manual entitled "Extended Functions" ref. 3299.

**Notes**

# DIGIDRIVE
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## 8 - SUMMARY OF THE SETTINGS FOR YOUR APPLICATION

| DIGIDRIVE type | Serial no. | Motor type | Motor no. | Commissioned on: |
|---|---|---|---|---|
| | | | | |

| Parameter | Name | Factory setting | Setting date: | Setting date: |
|---|---|---|---|---|
| 01 | Minimum limit | 0 | | |
| 02 | Maximum limit | 50.0 Hz | | |
| 03 | Acceleration ramp 1 | 5.0s/100 Hz | | |
| 04 | Deceleration ramp 1 | 10.0s/100 Hz | | |
| 05 | Selection of references | A1.A2 | | |
| 06 | Motor rated current | $I_{ns}$ | | |
| 07 | Motor rated speed (at full load) | 1500 min$^{-1}$ | | |
| 08 | Motor rated voltage | 230V or 400V | | |
| 09 | Power factor (cos φ) | 0.85 | | |
| 10 | Level 2 access and storage of security code | L1 | | |
| 11 | Preset frequency 1 | 0 | | |
| 12 | Preset frequency 2 | 0 | | |
| 13 | Preset frequency 3 | 0 | | |
| 14 | Preset frequency 4 | 0 | | |
| 15 | Jog operation frequency | 1.5 Hz | | |
| 16 | Selection of the type of signal for analogue input 2 (A2) | 4-.20 mA | | |
| 17 | Selection of bi-directional mode | OFF | | |
| 22 | Selection of load display | Ld | | |
| 23 | Unit for displaying the speed | Fr | | |
| 24 | Customer-defined unit scaling | 1.00 | | |
| 25 | Security code | 0 | | |
| 26 | Enable FWD/REV key on the keypad | OFF | | |
| 27 | Keypad reference on power-up | 0 | | |
| 28 | Copy parameters | no | | |
| 29 | Return to factory settings and brake control | no | | |
| 30 | Deceleration mode | 1 | | |
| 31 | Stop mode | 1 | | |
| 32 | Selection of dynamic U/f ratio | OFF | | |
| 33 | Selection of flying restart | 0 | | |
| 34 | Control logic polarity | On | | |
| 35 | Management of logic commands | 0 | | |

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| Parameter | Name | Factory setting | Setting date: | Setting date: |
|:---:|---|:---:|---|---|
| 36 | Assignment of the analogue output | Fr | | |
| 37 | Switching frequency | 6 kHz | | |
| 38 | Selection of autocalibration | 0 | | |
| 39 | Motor rated frequency | 50.0 Hz | | |
| 40 | Number of motor poles | Auto | | |
| 41 | Serial link mode | AnSI | | |
| 42 | Serial link transmission speed | 4.8 | | |
| 43 | Serial link address | 1.1 | | |
| 45 | Station address | 0 | | |
| 46 | Fieldbus transmission speed | 0 | | |
| 47 | Fieldbus diagnostics | 0 | | |
| 48 | Control mode | 3 then 1 | | |
| 49 | Boost | 3.0% motor Un | | |
| 50 | Assignment of terminal 13 to management of the PTC sensors | OFF | | |
| 51 | Zero frequency threshold | 1.0 Hz | | |
| 52 | Threshold adjustment | 0 | | |
| 53 | Threshold hysteresis | 0 | | |
| 54 | Time delay | 0 | | |

**Notes**

**Notes**

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