SEW EURODRIVE

Operating Instructions

MOVITRAC® LTP

Edition 10/2009

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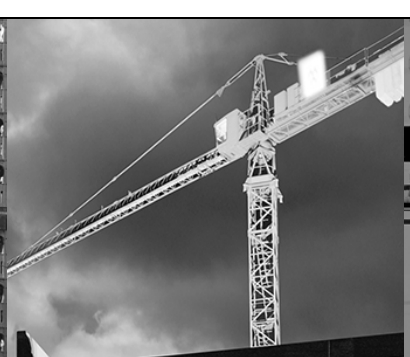


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1 Important Notes

1.1 How to use the operating instructions

The operating instructions are an integral part of the product and contain important information for operation and service. The operating instructions are written for all employees who assemble, install, startup, and service this product.

The operating instructions must be legible and accessible at all times. Make sure that staff responsible for the plant and its operation, as well as persons who work independently on the unit, have read the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

The safety notes in these operating instructions are structured as follows:

Symbol	⚠ SIGNAL WORD
	Nature and source of danger. Possible consequence(s) if the safety notes are disregarded. • Measure(s) to prevent the danger.

Symbol	Signal Word	Meaning	Consequences if disregarded
Example:  General hazard  Specific hazard, e.g. electric shock	⚠ **DANGER**	Imminent danger	Severe or fatal injuries
	⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
	⚠ **CAUTION**	Possible dangerous situation	Minor injuries
	NOTICE	Possible damage to property	Damage to the drive system or its environment
	**TIP**	Useful information or tip. Simplifies the handling of the drive system.	

1.3 Right to claim under limited warranty

Adhering to the operating instructions is a prerequisite for fault-free operation and the fulfillment of any right to claim under warranty. Read the operating instructions before you start working with the unit.

Make sure that the operating instructions are available to persons responsible for the system and its operation as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVITRAC® LT and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE does not assume liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright notice

1.6 Waste disposal

Please follow the current instructions: dispose in accordance with the regulations in force:

- Electronics scrap (printed-circuit boards)
- Plastic (housing)
- Sheet metal
- Copper

2 Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, please contact SEW-EURODRIVE.

2.1 Preliminary information

The following safety notes predominantly refer to the use of frequency inverters. Additionally, when using drives with motors or gearmotors, observe the corresponding safety notes in the respective operating instructions.

Please also observe the supplementary safety notes in the individual sections of this publication.

2.2 General

⚠ DANGER

During operation, frequency inverters can have live, bare parts according to their degree of protection.

Severe or fatal injuries.

- All work related to transportation, storage, setup / mounting, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observation of:
  - The relevant detailed operating instructions
  - The warning and safety signs on the motor / gearmotor
  - All other project planning documents, operating instructions and wiring diagrams related to the drive
  - The specific regulations and requirements for the system
  - The national / regional regulations governing safety and the prevention of accidents
- Never install damaged products.
- Immediately report any damages to the shipping company.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

This document includes further information.

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, trouble-shooting and maintenance for this product. Further, they are qualified as follows:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

All work in further areas of transportation, storage, operation and waste disposal may be carried out only by persons who are trained appropriately.

2.4 Designated use

Frequency inverters are components for controlling asynchronous AC motors. Frequency inverters are components intended for installation in electrical systems or machines. Never connect capacitive loads. Operation with capacitive loads results in over voltages and may destroy the unit.

The following standards apply, if the frequency inverters are marketed in the EU / EFTA:

- In case of installation in machines, startup of the drive inverters (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 2006/42/EC (machine directive); observe EN 60204.
- Startup (i.e. the start of designated use) is only permitted under observance of the EMC (2004/108/EC) directive.
- The frequency inverters comply with the requirements of the Low Voltage Directive 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these frequency inverters.

Observe the technical data and the connection requirements specified on the nameplate and the operating instructions.

2.4.1 Safety functions

MOVITRAC® LTP drive inverters may not perform safety functions without higher-level safety systems.

Use higher-level safety systems to ensure protection of equipment and personnel.

Do not use MOVITRAC® LTP drive inverters for any safety functions in conjunction with hoist applications.

Use monitoring systems or mechanical protection devices as safety features to avoid possible injury or damage to property.

2.5 Installation / assembly

Installation, startup and service work on the unit may only be carried out by trained personnel. The personnel must be trained in the relevant aspects of accident prevention and must comply with the regulations in force (e.g. EN 60204, VBG 4, DIN-VDE 0100/0113/0160).

Never install or operate damaged products. Please submit a complaint to the transport company immediately in the event of damage.

The units must be installed and cooled according to the regulations and specifications in this documentation.

Protect the frequency inverters from excessive strain. Do not twist any components and do not modify the insulation spaces. Do not touch any electronic components or contacts.

Frequency inverters contain components that can easily be damaged by electrostatic energy and improper handling. Electric components must not be mechanically damaged or destroyed.

The following applications are prohibited unless the unit is explicitly designed for such use:

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc. (frequency inverter may only be operated in climate class 3K3 to EN 60721-3-3)
- Use in non-stationary applications which are subject to mechanical vibration and impact loads in excess of the requirements in EN 61800-5-1.

2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live frequency inverters (e.g. BGV A3 for Germany).

The unit meets all requirements for reliable isolation of power and electronics connections in accordance with UL508. All connected circuits must also satisfy the requirements for reliable isolation so as to guarantee reliable isolation.

During installation, observe the specifications regarding cable cross sections, fusing and protective conductor connection. This publication contains additional information.

In this documentation, you will find notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Protective measures and protection devices must comply with the regulations in force (e.g. EN 60204 or EN 61800-5-1).

Ground the unit.

2.7 Safe disconnection

The unit meets all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.

2.8 Startup / operation

Systems with integrated frequency inverters must be equipped with additional monitoring and protection devices, as applicable, according to the relevant safety guidelines and regulations, such as legislation governing technical equipment, accident prevention regulations, etc.

Take suitable measures to ensure that the connected motor does not start up automatically when the inverter is switched on. To do this, connect binary inputs DI01 through DI03 to GND.

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

Do not touch live components or power connections until 10 minutes after disconnecting the frequency inverters from the supply voltage because there may still be some charged capacitors. Observe the corresponding labels on the frequency inverter.

Keep all covers and doors closed during operation.

The fact that the status LED and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the mains and no longer carries any voltage.

Mechanical blocking or safety functions inside the unit may result in the motor coming to a standstill. Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the supply system before correcting the error.

2.9 Operation and servicing

	**⚠ WARNING**
	Danger of electrical shock. High voltages are present in the terminals and in within the drive for up to 10 minutes after the electrical supply has been disconnected. Severe or fatal injuries. • Disconnect and isolate the MOVITRAC® LTP from the electrical supply at least 10 minutes before commencing any work on it.

- Dangerous voltages are present in the output terminals and the cables and motor terminals connected to them when the unit is switched on. Dangerous voltages may also be present when the unit is inhibited and the motor at a standstill.
- The unit is not necessarily deenergized when the LEDs and the 7-segment display are off.
- Safety functions inside the unit or a mechanical blockage may cause the motor to stop. The removal of the source of the malfunction or a reset can result in an automatic restart of the drive. If, for safety reasons, this is not permissible for the driven machine, disconnect the unit from the supply system before correcting the fault.

3 General specifications

3.1 Input voltage ranges

Depending upon model and power rating, the drives are designed for direct connection to the following supplies:

MOVITRAC® LTP 240 V units:

200 – 240 V ± 10 %, 1-phase* / 3-phase, 50 – 60 Hz ± 5 %

	TIP
	* It is also possible to connect 1-phase MOVITRAC® LTP units to 2 phases of a 200 – 240 V, 3-phase mains.

MOVITRAC® LTP 400 V units:

380 – 480 V ± 10 %, 3-phase, 50 – 60 Hz ± 5 %

MOVITRAC® LTP 525 V units:

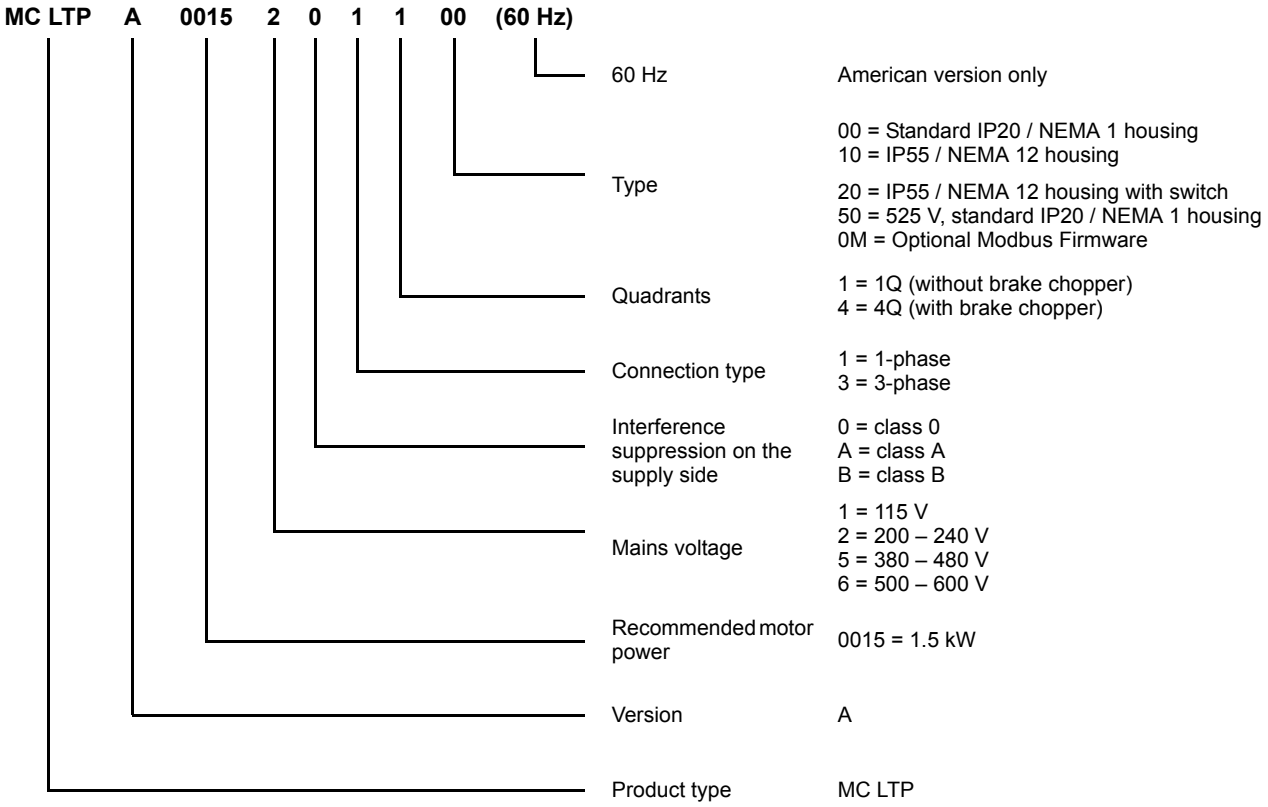
480 – 525 V ± 10 %, 3-phase, 50 – 60 Hz ± 5 % (Sizes 5 & 6 only)

MOVITRAC® LTP 575 V units:

500 – 600 V ± 10 %, 3-phase, 50 – 60 Hz ± 5 %

Products used with a 3-phase supply are designed for a maximum supply imbalance of 3 % between phases. For input supplies which have a supply imbalance greater than 3 % (typically the Indian subcontinent and parts of Asia Pacific including China) we recommend that input chokes are used.

3.2 Product designation



3.3 Overload capability

All MOVITRAC® LTP units have a possible overload of:

- 150 % for 60 seconds
- 175 % for 2 seconds

3.4 Protection features

- Output short-circuit, phase-to-phase, phase-to-ground
- Output over-current
  - Trip set at 175 % of rated drive current.
- Overload protection
  - Drive delivers 150 % of rated motor current for 60 seconds.
- Braking transistor protected against short-circuit.
- Braking resistor overload (when enabled)
- Over-voltage trip
  - Set at 123 % of drive maximum rated supply voltage.
- Under-voltage trip
- Over temperature trip
- Under temperature trip
  - Drive will trip if enabled below –10 °C
- Supply phase imbalance
  - A running drive will trip if there is a supply imbalance of > 3 % persisting for more than 30 seconds.
- Supply phase loss
  - A running drive will trip if one phase of a 3-phase supply is lost for more than 15 seconds.

4 Mechanical Installation

- Carefully inspect the MOVITRAC® LTP prior to installation to ensure it is undamaged.
- Store the MOVITRAC® LTP in its box until required. Storage should be clean and dry and within the ambient temperature range –40 °C to +60 °C.
- Install the MOVITRAC® LTP on a flat, vertical, flame-resistant, vibration-free surface, within suitable housing. This should be according to EN 60529 if specific Ingress Protection ratings are required.
- Do not place flammable material close to the drive.
- The entry of conductive or flammable foreign bodies should be prevented.
- The maximum operational ambient temperature is 50 °C for IP20 and 40 °C for IP55. The minimum operational ambient temperature is 0 °C.
- Relative humidity must be less than 95 % (non-condensing).
- MOVITRAC® LTP units can be installed side by side with their heatsink flanges touching. This gives adequate ventilation space between them. If the MOVITRAC® LTP is to be installed above another drive or any other heat-producing device, the minimum vertical spacing is 150 mm. The enclosure should either be force-ventilated or large enough to allow natural cooling (see chapter "IP20 / NEMA 1 housing: mounting and dimensions" on page 18).

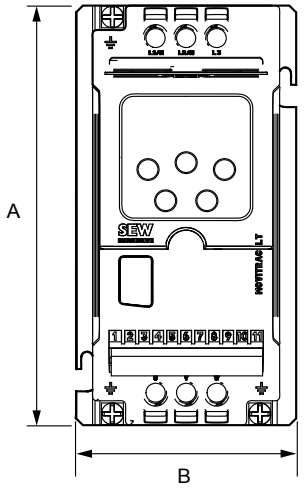
4.1 Dimensions

MOVITRAC® LTP is available in 2 housing versions:

- Standard IP20 / NEMA 1 housing for use in switch cabinets
- IP55 / NEMA 12 K version for size 1 and size 2 drives

The IP55 / NEMA 12 K housing is protected against moisture and dust. Therefore, the drives can be operated indoors under harsh conditions. Electronically, the drives are identical and the only differences are the dimensions of the housing and the weight.

4.1.1 Dimensions of the IP20 / NEMA 1 housing



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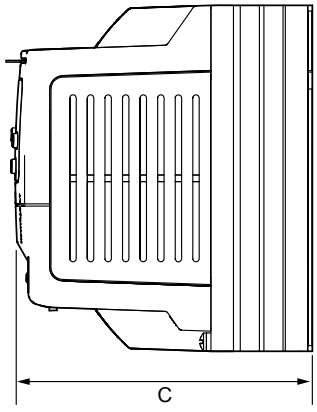

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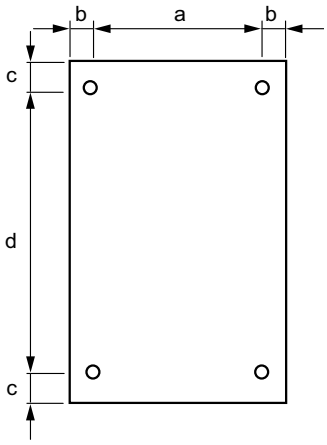

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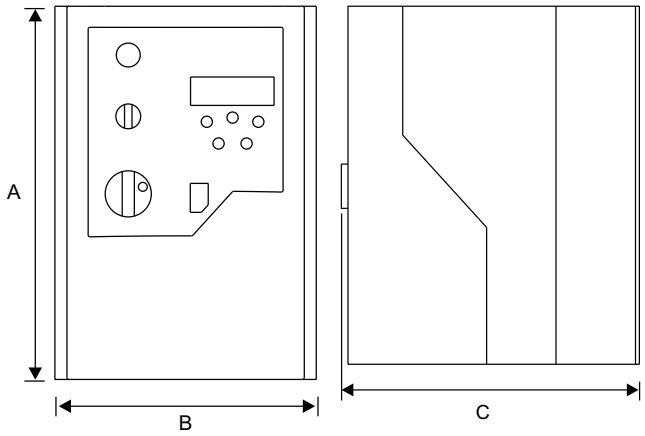
Dimension		Size 1	Size 2	Size 3	Size 4	Size 5	Size 6[1)]
Height (A)	[mm]	155	260	260	520	1045	1100
	[in]	6.10	10.20	10.20	20.47	41.14	43.31
Width (B)	[mm]	80	100	171	340	340	340
	[in]	3.15	3.94	6.73	13.39	13.39	13.39
Depth (C)	[mm]	130	175	175	220	220	330
	[in]	5.12	6.89	6.89	8.66	8.66	12.99
Weight	[kg]	1.1	2.6	5.3	28	68	Unit = 55 Choke = 27
	[lb]	2.43	5.73	11.68	61.73	149.91	Unit = 127.25 Choke = 59.52
a	[mm]	72	92	163	320	320	320
	[in]	2.84	3.62	6.42	12.6	12.6	12.6
b	[mm]	4	4	4	9.5	9.5	9.5
	[in]	0.16	0.16	0.16	0.37	0.37	0.37
c	[mm]	25	25	25	50	50	50
	[in]	0.98	0.98	0.98	1.97	1.97	1.97
d	[mm]	105	210	210	420	945	945
	[in]	4.13	8.27	8.27	16.54	37.21	37.21
Power terminal torque settings	[Nm]	1	1	1	4	8	8
	[lb.in]	8.85	8.85	8.85	35.4	70.8	70.8
Fixings		2 × M4	2 × M4	4 × M4	4 × M8	4 × M8	4 × M8

1) Size 6 comes with an external line choke

4.1.2 Dimensions of the IP55 / NEMA 12 housing (LTP xxx –10 and –20)



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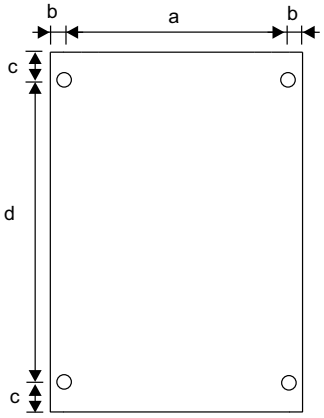

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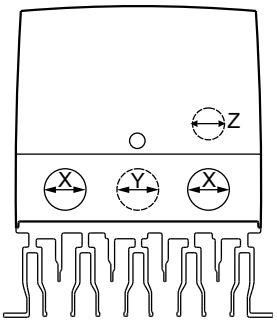

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Dimension		Size 1	Size 2
Height (A)	[mm]	200	310
	[in]	7.9	12.2
Width (B)	[mm]	140	165
	[in]	5.5	6.5
Depth (C)	[mm]	165	176
	[in]	6.5	6.9
Weight	[kg]	2.3	4.5
	[lb]	5.1	9.9
a	[mm]	128	153
	[in]	5	6
b	[mm]	6	6
	[in]	0.23	0.23
c	[mm]	25	25
	[in]	0.98	0.98
d	[mm]	142	252
	[in]	5.6	9.9
X	[mm]	22	25
	[in]	0.87	0.98
Y[1)]	[mm]	22	22
	[in]	0.87	0.87
Z[1)]	[mm]	17	17
	[in]	0.67	0.67
Power terminal torque settings	[Nm]	1	1
	[lb.in]	8.85	8.85
Control terminal torque settings	[Nm]	0.5	0.5
	[lb.in]	4.43	4.43
Fixings		2 × M4	4 × M4

1) Glands Y and Z are flip out glands.

4.2 IP20 / NEMA 1 housing: mounting and dimensions

For applications that require a higher IP rating than the IP20 offered by the standard drive, the drive must be mounted in housing. The following guidelines should be observed for these applications:

- Housing should be made from a thermally conductive material, unless forced ventilation is used.
- When vented housing is used, there should be venting above and below the drive to ensure good air circulation. Air should be drawn in below the drive and expelled above the drive.
- If the external environment contains contamination particles (e.g. dust), a suitable particle filter should be fitted to the vents and forced ventilation implemented. The filter must be serviced and cleaned appropriately.
- High moisture, salt or chemical content environments should use a suitably sealed (non-vented) housing.

4.2.1 Dimensions of non-vented metal housing

Drive power rating		Sealed housing							
		A		B		C		D	
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
Size 1	0.75 kW 230 V	300	11.81	250	9.84	200	7.87	50	1.97
Size 1	1.5 kW 230 V	400	15.75	300	11.81	250	9.84	75	2.95
Size 2	1.5 kW 230 V 0.75 kW, 1.5 kW, 2.2 kW 400 V 2.2 kW 400 V	400	15.75	300	11.81	300	11.81	60	2.36
Size 2	2.2 kW 230 V 4.0 kW 400 V 5.5 kW 575 V	600	23.62	450	17.72	300	11.81	100	3.94

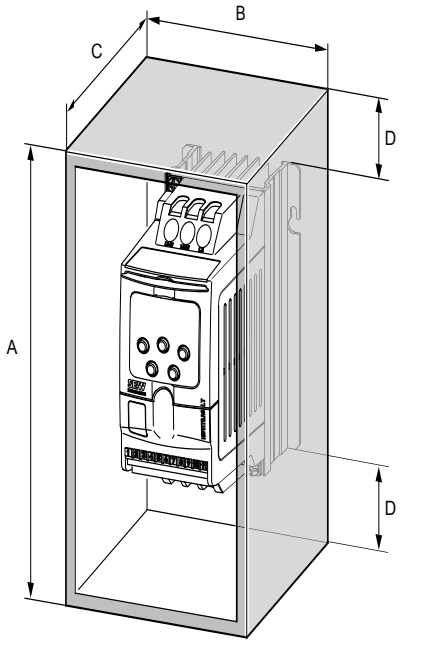


Figure 1: Housing

4.2.2 Dimensions of vented housing

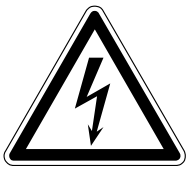
Drive power rating		Vented housing							
		A		B		C		D	
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
Size 1	1.5 kW	400	15.75	300	11.81	150	5.91	75	2.95
Size 2	5.5 kW	600	23.62	400	15.75	250	9.84	100	3.94
Size 3	15 kW	800	31.50	600	23.62	300	11.81	150	5.91
Size 4	22 kW	1000	39.37	600	23.62	300	11.81	200	7.87
Size 4	37 kW	–	–	–	–	–	–	–	–
Size 5	90 kW	–	–	–	–	–	–	–	–
Size 6	160 kW	–	–	–	–	–	–	–	–

4.2.3 Dimensions of force vented housing

Drive power rating		Force vented housing (with fan)								
		A		B		C		D		
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	Air Flow
Size 1	1.5 kW	275	10.83	150	5.91	150	5.91	50	1.97	> 15 m^3 / h
Size 2	5.5 kW	320	12.60	200	7.87	250	9.84	75	2.95	> 45 m^3 / h
Size 3	15 kW	400	15.75	250	9.84	250	9.84	100	3.94	> 80 m^3 / h
Size 4	22 kW	800	31.50	500	19.69	300	11.81	130	5.12	> 300 m^3 / h
Size 4	37 kW	800	31.50	500	19.69	300	11.81	130	5.12	> 300 m^3 / h
Size 5	90 kW	1500	59.06	600	23.62	400	15.75	200	7.87	> 900 m^3 / h
Size 6	160 kW	1600	62.99	600	23.62	400	15.75	250	9.84	> 1000 m^3 / h

5 Electrical Installation

It is essential to comply with the safety instructions in chapter 2 during installation.



⚠ WARNING

Danger of electrical shock. High voltages are present in the terminals and in within the drive for up to 10 minutes after the electrical supply has been disconnected.

Severe or fatal injuries.

- Disconnect and isolate the MOVITRAC® LTP from the electrical supply at least 10 minutes before commencing any work on it.

- MOVITRAC® LTP units should only be installed by qualified electricians and in accordance with local and national regulations and codes of practice.
- The MOVITRAC® LTP has an Ingress Protection rating of IP20. For higher IP ratings, use a suitable enclosure or the IP55 version.
- Where the electrical supply to the drive is through a plug and socket connector, do not disconnect until 10 minutes have elapsed after turning off the supply.
- Ensure correct earthing connections. See diagram in chapter "Drive and motor connection" on page 23.
- The earth cable must be sufficient to carry the maximum supply fault current, which is normally limited by the fuses or motor circuit breaker.

⚠ HAZARD

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

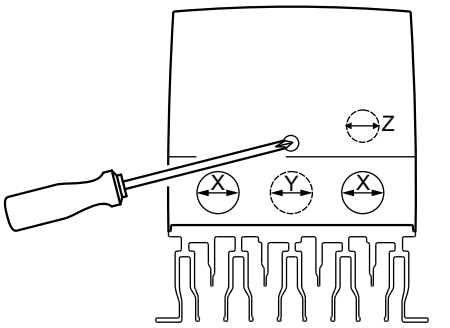
- MOVITRAC® LTP is not designed for use as a safety device in hoist applications. Use monitoring systems or mechanical protection devices to ensure safety.

5.1 Prior to installation

- Ensure that the supply voltage, frequency and number of phases (single or 3-phase) correspond to the rating of the MOVITRAC® LTP as delivered.
- An isolator or similar should be installed between the power supply and the drive.
- Never connect the mains power supply to the MOVITRAC® LTP output terminals U, V or W.
- When installing 575 V inverters ensure the motor is always in STAR connection.
- The cables are only protected when slow blow HRC fuses or a motor circuit breaker (MCB) are used.
- Do not install any type of automatic switchgear between the drive and the motor. Wherever control cabling is close to power cabling, maintain a minimum separation of 100 mm and arrange crossings at 90°.
- Ensure that screening or armoring of power cables is effected in accordance with the connections diagram in chapter "Drive and motor connection" on page 23.
- Ensure that all terminals are tightened to the appropriate torque.

5.1.1 Opening the front cover

IP55 size 1 & 2 Insert a screwdriver into the opening as illustrated below to release the front cover.



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5.1.2 Helpcard

In the IP20 housing the helpcard is located in a separate slot above the display. In the IP55 housing the helpcard is attached to the inside of the front cover.

5.2 Installation

Connect the drive according to the following diagram. Ensure that the motor terminal box connections are correct. There are two standards in general: Star and Delta. It is essential to ensure that the motor is connected in accordance with the voltage at which it will be operated. For more information, refer to the diagram below.

Please refer to chapter "Technical data" for the recommended cabling and wiring sizing.

It is recommended that the power cabling should be 4-core PVC-insulated screened cable, laid in accordance with local industrial regulations and codes of practice.

The ground terminal of each MOVITRAC® LTP should be individually connected **directly** to the site earth (ground) busbar (through the filter if installed) as shown. MOVITRAC® LTP ground connections should not loop from one drive to another. They should also not loop to or from any other equipment. Ground loop impedance must conform to local industrial safety regulations. To meet UL regulations, UL approved ring crimp terminals should be used for all earth wiring connections.

5.2.1 Motor terminal box connections

Motors are connected in either Star, Delta, Double Star or Star Nema motors. The motor rating plate indicates the voltage rating for the method of connection, which must match the operating voltage of the MOVITRAC® LTP unit.

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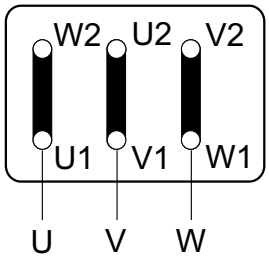
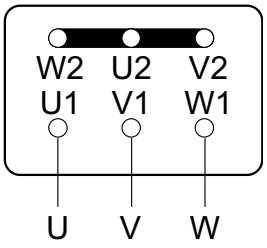
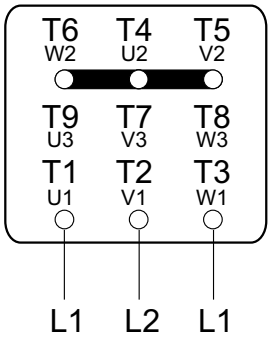


Low voltage Δ

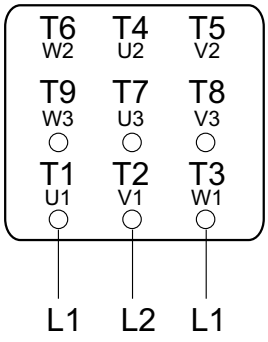


High voltage 人

R76

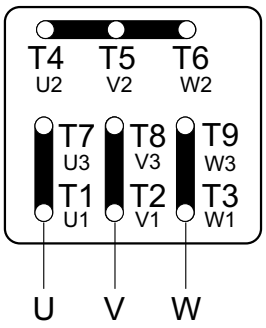


Low voltage 人人



High voltage 人

DT / DV



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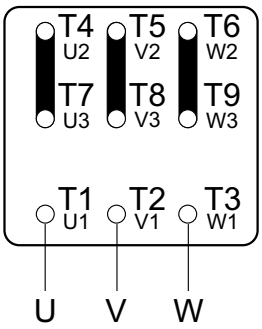


High voltage 人

5.2.2 Drive and motor connection

WARNING

Danger of electrical shock. Risk of exposure to high voltage may occur if the unit is wired incorrectly.

Severe or fatal injuries.

- It is essential to observe the connection sequence illustrated below.

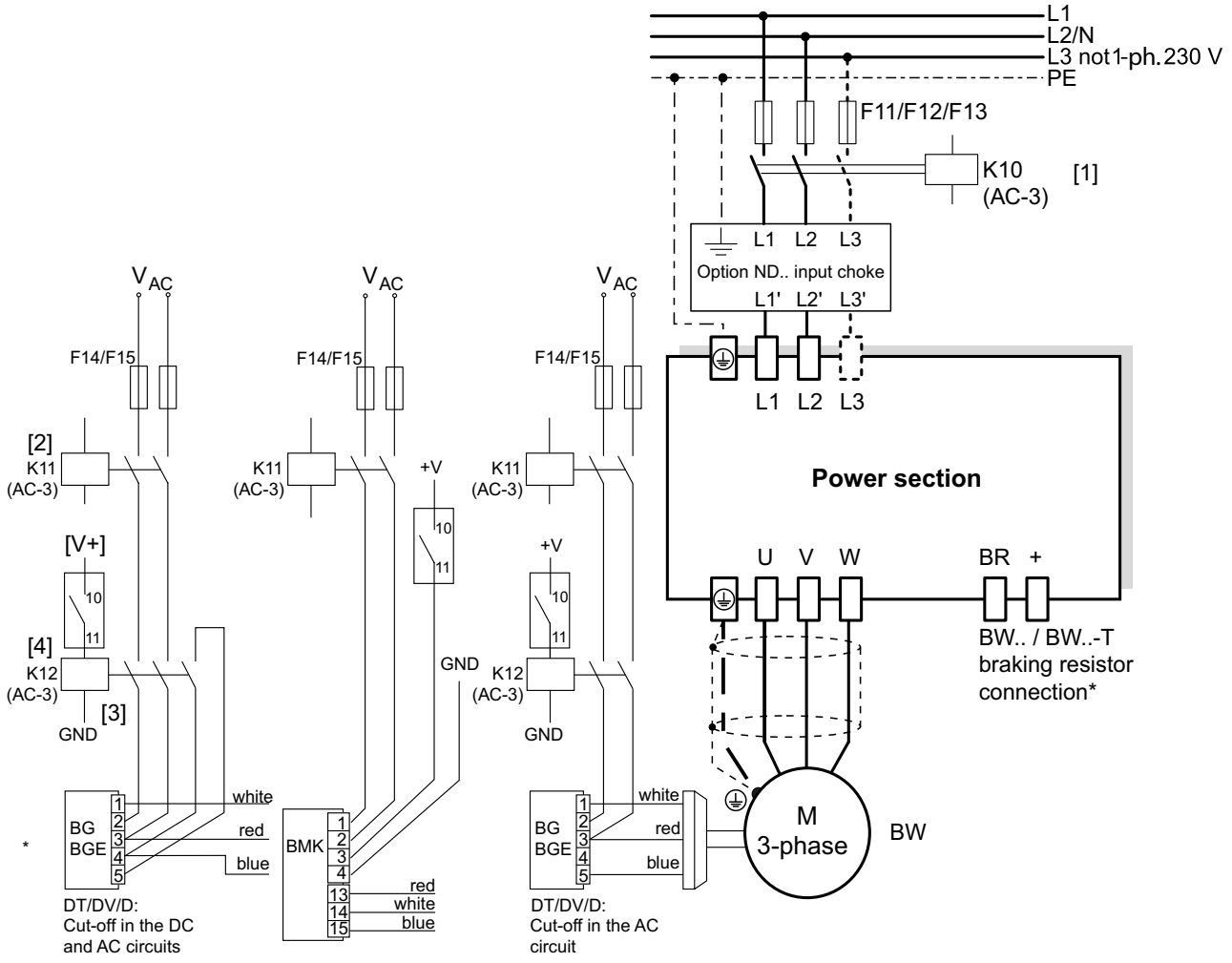


Figure 2: Wiring diagram for power section

[1] Mains supply contactor to drive

[2] Mains supply to brake rectifier, switched simultaneously by K10

[3] Control contactor / relay, energized via the internal relay contact [4] in the drive and supplies the brake rectifier

[4] Potential free relay contact inside the drive

[V+] External power supply for energizing the control contactor / relay

* Size 2 and above

	TIP
	• Connect the brake rectifier using a separate supply system lead. • **Supply via the motor voltage is not permitted!**

The 230 V and 400 V drives do not require a line choke on the supply unless the specified supply voltages cannot be guaranteed.

Drives from 0.37 kW (0.5 HP) to 5.5 kW (7.5 HP) must be fitted with external line chokes if the quality of the supply cannot be guaranteed.

An external line choke is always required for 575 V drives from 0.75 kW (1 HP) to 5.5 kW (7.5 HP).

All drives with 7.5 kW (10 HP) or higher have a built-in choke and therefore do not need external chokes fitted to ensure transient protection.

An external choke is required if 230 V or 400 V drives up to 5.5 kW (7.5 HP) are installed under the following conditions:

- Local generator
- Large loads on the same supply
- High dV / dt voltage fluctuations e.g. when welders are being used
- Outdoor pumping stations with exposed supply lines, which may be hit by lightening strikes.

Always switch off the brake on the DC and AC sides with:

- All hoist applications
- Drives that require a rapid brake response time

It is essential to adhere to the connection sequence of the brake connector. Incorrect connection will lead to irreparable damage to the brake. The connection to the brake rectifier requires a separate supply system cable. Supply from the motor voltage is not permitted.

If the brake rectifier is installed in the switch cabinet the connecting cable between the brake rectifier and the brake must be routed separately to other power cables. Routing together with other cables is only permitted if the other cables are shielded. Set P2-13 to 3 to use the relay output to control the brake rectifier (BGx).

5.2.3 Motor thermal protection (TF / TH)

Motors with an internal PTC over-temperature sensor (TF, TH or similar) can be connected directly to the MOVITRAC® LTP. A trip will then be displayed on the drive.

The sensor is connected to terminal 1 (+24 V) and Digital Input 3. Parameter P2-01 must be set to external trip input to receive over-temperature trips. The trip level should be set to 2.5 kΩ..

5.2.4 Signal terminal overview

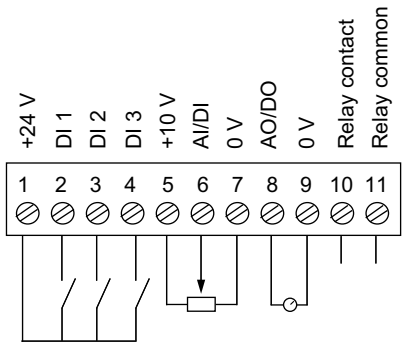
The User Control terminals are available via an 11-way pluggable connector. All terminals are galvanically isolated, allowing direct connection to other equipment.

	NOTICE
	Danger of damage to the MOVITRAC® LTP unit. Do not connect mains supply voltages to any terminals other than the user relay output. Doing so will result in permanent damage to the unit. The user relay output can handle up to AC 250 V. All other inputs only withstand DC 30 V without damage.

The functionality of the inputs and outputs is user configurable. All operating modes are set up via the parameter set.

Up to 100 mA can be sourced from the User +24 V output and up to 20 mA from the analog output.

IP20 and IP55



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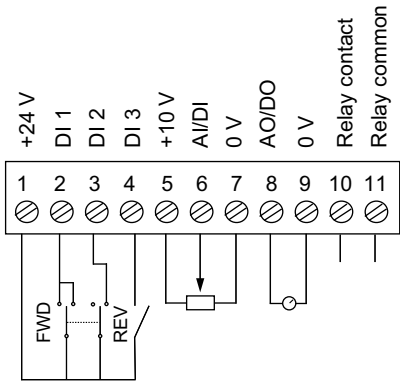
IP55 with switch option



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The signal terminal block has the following signal connections:

Terminal no.	Signal	Connection	Description
1	+24 V	+24 V ref out	Ref. to activate DI1 – DI3 (100 mA max.)
2	DI1	Digital input 1	Positive logic "Logic 1" input voltage range: DC 8 – 30 V "Logic 0" input voltage range: DC 0 – 8 V
3	DI2 / DO2	Digital input 2 / Digital output 2	
4	DI3 / AI2	Digital input 3 / Analog input 2	Positive logic (P2-33) "Logic 1" input voltage range: DC 8 – 30 V "Logic 0" input voltage range: DC 0 – 8 V 0 – 10 V, 0 – 20 mA, 4 – 20 mA
5	+24 V	+24 V ref out	24 V ref for analog input (pot supply +, 100 mA max., 1 kΩ min.)
6	AI / DI	Analog input (12 bit) Digital input 4	0 – 10 V, –10 – 10 V, 0 – 24 V, –24 – 24 V "Logic 1" input voltage range: DC 8 – 30 V (P2-30)
7	0 V	0 V common	0 V ref for analog input (pot supply –)
8	AO / DO	Analog output (8 bit) Digital output	0 – 10 V, 4 – 20 mA analog 24 V, 20 mA digital (P2-36)
9	0 V	0 V common	0 V ref for analog output
10	Relay contact	Relay contact	N.O. relay contact (AC 250 V / DC 30 V @ 5 A)
11	Relay common	Relay common	

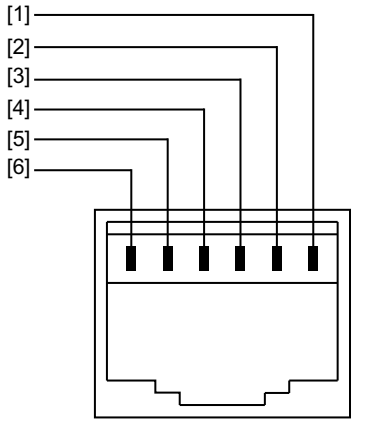
Key information on the control terminal

- Maximum input voltage on any terminal: DC 30 V
- All outputs are short circuit proof
- Recommended potentiometer resistance: 1 kΩ.
- Digital input response time < 8 ms
- Bipolar analog input response time < 16 ms. Resolution ±12-bit (0.025 %)
- Second analog input response time < 16ms. Resolution +11-bit (0.05 %)
- Analog / digital output response time < 16ms. Resolution 8-bit (0.25 %)

5.2.5 RJ11 Communication socket

The RJ11 communication socket can be used to set up a RS-485 communication to the PC via UWS11A.

With MOVITRAC® LTP units it is possible to use this RJ11 connector to set up a MODBUS communication network.



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[1] RS-485– / MODBUS [1)]

[2] RS-485+ / internal bus [1)]

[3] RS-485– / internal bus [1)]

[4] +24 V

[5] 0 V

[6] RS-485+ / MODBUS [1)]

1) The bit format is fixed as: 1 start bit, 8 data bits, 1 stop bit, no parity

The internal bus works with 115 k Baud (bps). It can be used for drive-to-drive communication. In this case, up to 63 drives can communicate.

The MODBUS RTU works between 9.6 and 115 k Baud (bps). It can be used to communicate directly with an external PLC or with a fieldbus gateway. In this case, up to 63 drives can be controlled via bus communication.

5.3 Optical interface

The optical interface, which is located next to the RJ11 connector, is mainly used for commissioning and monitoring the drive with a pocket PC. When LTP shell CE is installed, the pocket PC can be used to for drive startup and to monitor the current drive status.

5.4 UL-compliant installation

Note the following for UL-compliant installation:

- The drives can be operated within an ambient temperature of 0 – 50 °C.
- Only use copper connection cables which can withstand ambient temperatures of up to 75 °C.
- Permitted tightening torques for MOVITRAC® LTP power terminals are:
  - Sizes 1, 2 & 3 = 1 Nm / 8.9 lb.in
  - Size 4 = 4 Nm / 35.4 lb.in
  - Sizes 5 & 6 = 8 Nm / 70 lb.in

MOVITRAC® LTP drive inverters are suitable for operation in voltage power systems with an earthed star point (TN and TT systems), which can supply a maximum supply current and a maximum supply voltage in accordance with the following table. The fuses listed in the following tables are the maximum permitted fuses for each inverter. Only use melting fuses.

Only use tested units with a limited output voltage (V_{max} = DC 30 V) and limited output current (I = < 8 A) as an external DC 24 V source.

UL certification does not apply to operation in voltage supply systems with a non-earthed star point (IT systems).

5.4.1 200 – 240 V Units

MOVITRAC® LTP...	Short circuit rating	Max. supply voltage	Fuses
0004	AC 5000 A	AC 240 V	AC 6 A / 250 V
0008	AC 5000 A	AC 240 V	AC 10A / 250 V
0015	AC 5000 A	AC 240 V	AC 20A / 250 V
0030, 0040, 022	AC 5000 A	AC 240 V	AC 32 A / 250 V
0055	AC 5000 A	AC 240 V	AC 50 A / 250 V
0075	AC 5000 A	AC 240 V	AC 80 A / 250 V
0110, 0150	AC 5000 A	AC 240 V	AC 100 A / 250 V
0185	AC 5000 A	AC 240 V	AC 125 A / 250 V
0220	AC 10000 A	AC 240 V	AC 160 A / 250 V
0300	AC 10000 A	AC 240 V	AC 200 A / 250 V
0370, 0450	AC 10000 A	AC 240 V	AC 300 A / 250 V
0550	AC 10000 A	AC 240 V	AC 350 A / 250 V
0750	AC 10000 A	AC 240 V	AC 400 A / 250 V
0900	AC 10000 A	AC 240 V	AC 500 A / 250 V

5.4.2 380 – 480 V Units

MOVITRAC® LTP...	Short circuit rating	Max. supply voltage	Fuses
0008, 0015, 0022	AC 5000 A	AC 480 V	AC 10 A / 600 V
0040	AC 5000 A	AC 480 V	AC 20 A / 600 V
0055, 0075	AC 5000 A	AC 480 V	AC 32 A / 600 V
0110, 0150	AC 5000 A	AC 480 V	AC 50 A / 600 V
0185	AC 5000 A	AC 480 V	AC 80 A / 600 V
0220, 0300	AC 5000 A	AC 480 V	AC 100 A / 600 V
0370	AC 5000 A	AC 480 V	AC 125 A / 600 V
0450	AC 10000 A	AC 480 V	AC 160 A / 600 V
0550	AC 10000 A	AC 480 V	AC 200 A / 600 V
0750, 0900	AC 10000 A	AC 480 V	AC 300 A / 600 V
1100	AC 10000 A	AC 480 V	AC 350 A / 600 V
1320	AC 10000 A	AC 480 V	AC 400 A / 600 V
1600	AC 10000 A	AC 480 V	AC 500 A / 600 V

5.4.3 575 V Units

MOVITRAC® LTP...	Short circuit rating	Max. supply voltage	Fuses
0008	AC 5000 A	AC 575 V	AC 6 A / 600 V
0015, 0022, 0037	AC 5000 A	AC 575 V	AC 10 A / 600 V
0055	AC 5000 A	AC 575 V	AC 20 A / 600 V
0075, 0110	AC 5000 A	AC 575 V	AC 32 A / 600 V
0150	AC 500 A	AC 575 V	AC 25 A / 600 V
0220	AC 500 A	AC 575 V	AC 50 A / 600 V
0300	AC 500 A	AC 575 V	AC 63 A / 600 V
0450	AC 1000 A	AC 575 V	AC 80 A / 600 V

5.5 Electromagnetic compatibility

The MOVITRAC® LTP range of frequency inverters is designed for use in machines and drive systems. They comply with the EMC product standard EN 61800-3 for variable speed drives. For EMC compliant installation of the drive system, follow the guidelines set out in council directive 2004/108/EC (EMC).

5.5.1 EMC immunity

The MOVITRAC® LTP range meets the immunity levels defined in EN 61800-3 for both industrial and domestic (light industrial) environments.

5.5.2 EMC emissions

The MOVITRAC® LTP EMC emission levels comply with the limit classifications defined in EN 61800-3 and EN 55014, allowing it to be used in both industrial and domestic (light industrial) applications.

To obtain the best EMC performance the drives should be installed in accordance with the wiring guidelines in chapter "Installation" on page 21, thereby ensuring good earth connections for the drive system. Screened motor cable must be used to achieve compliance with the radiated emissions levels.

The following table defines the conditions for the use of MOVITRAC® LTP in drive applications:

Drive type / rating	Cat C1 (class B)	Cat C2 (class A)	Cat C3
230 V, 1-phase ratings LTPA xxxx 2B1-x-xx	No additional filtering required Use screened motor cable		
230 V, 3-phase ratings LTPA xxxx 2A3-x-xx	Use < 5 m screened motor cable	No additional filtering required Use screened motor cable	
400 V, 3-phase ratings LTPA xxxx 5A3-x-xx	Use < 5 m screened motor cable	No additional filtering required Use screened motor cable	
525 V & 575 V, 3-phase ratings LTPA xxxx 603-x-xx	Use external filter Use screened motor cable		

TIP

For size 5 and 6 drives, a ferrite ring must be installed on the output motor cable. All 3 phases of the motor cable must be wrapped one whole turn around the ferrite ring.

6 Startup

6.1 Operating the keypad

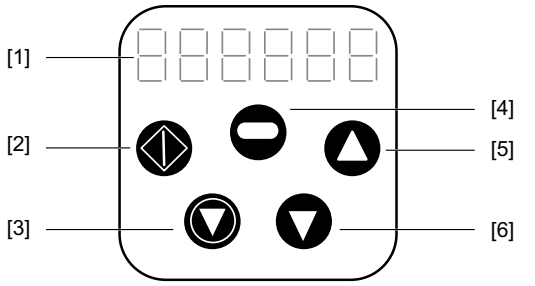
Each MOVITRAC® LTP has an integrated keypad as standard, allowing drive operation and set up without any additional equipment.

The keypad consists of 5 keys with the following functions:

Start / Run	Enable running of motor
Stop / Reset	Stop motor / Reset trip
Navigate	Press and release to display A / Hz / rpm Press and hold to enter / exit parameter edit mode
Up	Increase Parameter / Value
Down	Decrease Parameter / Value

The Start / Stop buttons on the keypad are disabled when the parameters have their factory default settings. To enable the operation of the <start> / <stop> buttons on the keypad, set P1-12 to 1 or 2 (see chapter "Standard parameters" on page 40).

The Navigate key alone is used to gain access to the parameter edit menu. Pressing and holding this key (> 1 second) allows the user to toggle between the parameter edit menu and the real-time display (where the drive operating status / running speed is displayed). By pressing this key (< 1 second) the user is able to toggle between the operating speed and operating current during drive operation.



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[1] Display
[2] Start
[3] Stop / Reset
[4] Navigate
[5] Up
[6] Down

	TIP
	To reset to factory default settings, press the Up, Down, and Stop buttons simultaneously for > 2 s. The display then shows "P-deF". Press the Stop button to acknowledge the change and to reset the drive.

6.2 Easy startup

⚠ CAUTION

Danger due to possible rotating shaft during auto-tune procedure.

Minor injuries.

- Uncouple the load from the motor.
- Take precautionary measures to ensure that no risk is posed by possible rotation of the shaft.

1. Connect the motor to the drive, checking the connection for the motor voltage rating.
2. Enter motor data from motor nameplate:
   - P1-07 = motor rated voltage
   - P1-08 = motor rated current
   - P1-09 = motor rated frequency
3. Enable the drive by making a connection between terminal 1 and 2. The drive automatically carries out a static auto-tune where the motor winding is measured. Auto-tune is carried out only once after initial startup.

   If auto-tune does not occur, set P4-02 to "1" to enable auto-tune. For safety reasons parameter P4-02 can only be set and enabled on the drive.
4. For high performance sensorless vector control set P1-14 to "101", P4-01 to "0" and P4-05 = cos Φ / power factor of motor (from motor nameplate).

   Setting P4-02 to "1" then starts auto-tune where the motor winding is measured.

6.2.1 Terminal mode (default setting)

To operate in terminal mode (default setting):

- Ensure that P1-12 is set to "0" (default setting).
- Connect a switch between terminals 1 and 2 on the user terminal block.
- Connect a potentiometer (1 k – 10 k) between terminals 5, 6 and 7 with the wiper connected to pin 6.
- Close the switch to enable the drive.
- Adjust speed with the potentiometer.

TIP

The default settings (P1-12 = 0 and P2-01 = 0) for the optional switch in the IP55 switch cabinet is FWD / REV. The motor speed can be set via the potentiometer.

6.2.2 Keypad mode

To operate in keypad mode:

- Change P1-12 to 1 (uni-directional) or 2 (bi-directional).
- Place a wire link or switch between terminals 1 and 2 on the user terminal block to enable the drive.
- Now press the <start> key. The drive enables at 0.0 Hz.
- Press the <up> key to increase speed.
- To stop the drive, press the <stop> key.
- If the <start> key is now pressed, the drive will return to its original speed, unless configured to start from zero speed (see P2-19). (If bi-directional mode is enabled (P1-12 = 2), pressing the <start> key reverses the direction).

	TIP
	The desired target speed can be preset by pressing the <stop> key whilst the drive is stopped. When the <start> key is subsequently pressed, the drive will then ramp to this speed.

6.2.3 Key parameters

- Adjust the maximum and minimum speed limit using P1-01 and P1-02.
- Adjust the acceleration and deceleration times using P1-03 and P1-04.
- Set up the motor nameplate data in parameters P1-07 to P1-10.

7 Operation and Service

To enable the operational status of the drive to be determined at any time, the following information is displayed:

Status	Mnemonic display
Drive OK	Static drive status
Drive running	Operational drive status
Fault / trip	Fault

7.1 Drive status

7.1.1 Static drive status

The following list indicates which mnemonics will be displayed as drive status information when the motor is at a standstill.

Mnemonic	Description
StoP	Drive power stage disabled. This message will be displayed when the drive is stopped and no faults are present. The drive is ready for normal operation.
P-deF	Default parameters loaded. This message will be displayed when the user invokes the command to load the factory default parameters. The reset button has to be pressed before the drive can be operated again.
Stndby	Drive is in standby. This message will be displayed 30 seconds after the drive is at 0 speed and the setpoint is 0.

7.1.2 Operational drive status

The following list indicates which mnemonics will be displayed as drive status information when the motor is in operation.

Use the <Navigate> button on the keypad to toggle between output frequency, output current and speed.

Mnemonic	Description
H xxx	The drive output frequency is displayed in Hz. This message will be displayed when the drive is running.
A xxx	The drive output current is displayed in Amp. This message will be displayed when the drive is running.
xxxx	The drive output speed is displayed in rpm. This message will be displayed when the drive is running and the motor rated speed is entered in parameter P-09.
. . . . . (flashing dots)	The output current of the drive exceeds the current which is set in P1-08. MOVITRAC® LTP will monitor the level and duration of the overload. Depending on the overload level, the unit will trip with "I.t-trP".
Auto-t	The automatic motor parameter measurement is carried out to configure the motor parameters. Auto-tune runs automatically on first enable after parameter default operation and when P1-08 has been changed. No hardware enable is required to run auto-tune.
C xxx	Speed scaling factor. Referring to P2-21 and P2-22.

7.2 Fault codes and history

7.2.1 Troubleshooting

Fault finding chart

Symptom	Cause and Solution
Overload or over-current trip on unloaded motor during acceleration	Check the Star / Delta terminal connection in the motor. The rated operating voltage of the drive and motor should match. The Delta connection always gives the lower voltage rating of a dual voltage motor.
Overload or over-current – motor does not spin	Check for locked rotor. Check that the mechanical brake is released (if fitted).
Drive will not enable – display remains on "StoP"	Check that the hardware enable signal is applied to digital input 1. Ensure that the User +24 V output voltage (between terminals 5 and 7) is correct. If not, check wiring to user terminal strip. Check P1-12 for terminal / keypad mode. If keypad mode is selected, press the <start> button. Check that the supply voltage is within specification.
Drive runs incorrectly when in vector mode	Ensure that the motor name plate data has been entered into P1-07, P1-08, P1-09 before the parameter auto-tune function has been carried out. Set P4-02 = 1 to carry out auto-tune.
In very cold ambient conditions, drive will not power up	If the ambient temperature is less than –10 °C, the drive may not power up. Ensure that a local heating source keeps the ambient temperature above 0 °C in these conditions.
Speed limit or rated frequency parameters cannot be set above 250 Hz, 500 Hz or 1000 Hz	The maximum output motor frequency is limited by the switching frequency. Ensure that P2-24 is at least 16 times greater than the required motor output frequency before setting the required maximum or rated output frequency parameters.
Extended menus cannot be accessed	Ensure that P1-14 is set to the extended access code. This is “101” unless the code in P2-37 has been changed by the user.

7.2.2 Fault history

The parameter P1-13 in the parameter mode holds a record of the 4 most recent trips and / or events that have occurred. Each trip will be displayed in abbreviated text with the most recent trip being displayed first (on entering into the value of P1-13).

Whenever a new trip occurs, this is entered at the top of the list and the other trips move down. The oldest trip will then be removed from the trip log.

	TIP
	If the most recent trip in the trip log is an under-voltage trip, further under-voltage trips will not be entered into the trip log. This is to ensure that the trip log does not fill up with under-voltage trips which occur naturally every time the MOVITRAC® LTP is turned off.

7.2.3 Fault codes

Trip message	Explanation	Solution
"P-dEF"	Factory default parameters have been loaded.	Press the STOP key. The drive is ready to configure for the required application.

“O-I”	Over-current on drive output to motor.
	Excess load on motor.
	Over temperature on drive heat-sink.
		• Check the motor and motor connection cable for ph-ph or ph-Earth short circuit.
		• Check the load mechanically for a jam or stalled condition or shock loads.
		• Ensure the motor nameplate parameters are entered correctly, P1-07, P1-08, P1-09.
		• If operating in Vector mode (P4-01 = 0 or 1):
		  • also check motor power factor in P4-05.
		  • reduce speed loop gain in P4-03.
		• Ensure an auto-tune has been successfully completed for the connected motor.
		• Increase the ramp-up time in P1-03.

“I_t-trP”	Drive overload trip, occurring when the drive has been delivering > 100 % rated current (set in *P1-08*) for a period of time. The display flashes to indicate an overload condition.	• Increase the acceleration ramp or decrease the motor load. • Check the cable length is within the drive specification. • Ensure the motor nameplate parameters are entered correctly, P1-07, P1-08, P1-09. • If operating in Vector mode (P4-01 = 0 or 1), also check the motor power factor in P4-05. • Ensure an auto-tune has been successfully completed for the connected motor. • Check the load mechanically to ensure it is free and there are no jams, blockages or other mechanical faults.
"OI-b"	Brake channel over-current. Over-current in the braking resistor circuit.	• Check the cables to the braking resistor. • Check the braking resistor value. • Ensure minimum resistance values from the rating tables are observed.
"OL-br"	Braking resistor overload	• Increase the deceleration time, reduce the load inertia or add further braking resistors in parallel. • Ensure the minimum resistance values from the rating tables are observed.
“PS-trP”	Internal power stage fault	Trip on drive enable: • Check for a wiring error or short circuit. • Look for a ph-ph or ph-Earth short circuit. Trip during operation: • Check for sudden overload or over-temperature. • Additional space or cooling may be required.
“O_Uolt”	Over-voltage on DC bus	• Check whether the supply voltage is within limits. • If a trip occurs on deceleration, increase the deceleration time in P1-04.
“U_Uolt”	Under-voltage on DC bus	Occurs routinely when the drive is powered down. If it occurs whilst running, check the supply voltage.
“O-t”	Heatsink over temperature	• Check drive cooling and enclosure dimensions. • Additional space or cooling may be required.
“U-t”	Under temperature	• Occurs when the ambient temperature is less than –10 °C • Increase the ambient temperature to above –10 °C in order to start the drive.
"th-Flt"	Faulty thermistor on heatsink	Contact SEW-EURODRIVE Service.
“E-triP”	External trip (connected to digital input 3)	• E-trip on digital input 3. A normally closed contact has opened for some reason. • Check the motor thermistor (if connected).
"4-20 F"	Analog input current out of range	• Check that the input current is within the range defined in P2-36. • Check the cable connection.

Trip message	Explanation	Solution
"SC-trP"	Communication loss trip	• Check the communication link between the drive and external devices. • Ensure each drive in the network has a unique address.
"P-LOSS"	Input phase loss trip	The drive intended for use with a 3-phase supply has lost one input phase.
"Ph-1b"	Phase imbalance	• The mains incoming supply voltage has an imbalance of > 3 % for over 30 seconds. • Check the incoming supply and fuses.
"dAtA-F"	Internal memory fault	• Parameters were not saved, defaults reloaded. • Try again. If the problem recurs, contact SEW-EURODRIVE Service.
"At-FO1"	Auto-tune failed	• The measured motor stator resistance varies between phases. • Ensure the motor is connected correctly and is fault-free. • Check the windings for correct resistance and balance.
"At-FO2"		• The measured motor stator resistance is too high. • Ensure the motor is connected correctly and fault-free. • Check that the power rating corresponds to the power rating of the connected drive.
"At-FO3"		• The measured motor inductance is too low. • Ensure the motor is connected correctly and fault-free.
"At-FO4"		• The measured motor inductance is too high. • Ensure the motor is connected correctly and fault-free. • Check that the power rating corresponds to the power rating of the connected drive.
"At-FO5"		• The measured motor parameters are not convergent. • Ensure the motor is connected correctly and fault-free. • Check that the power rating corresponds to the power rating of the connected drive.
"SPIn-F"	Spin start failed	The spin start function failed to detect the motor speed.

7.3 SEW electronics service

Send in for repair Please contact the **SEW-EURODRIVE electronics service if a fault cannot be rectified**.

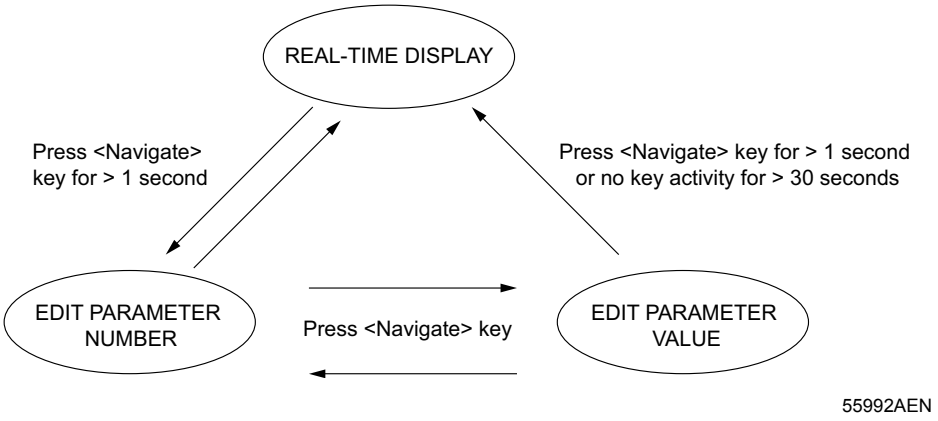
Please provide the following information when sending the unit in for repair:

- Serial number (→ nameplate)
- Unit designation
- Brief description of the application (application, control via terminals or serial)
- Connected components (motor, etc.)
- Nature of the error
- Accompanying circumstances
- Your own presumption of what has happened
- Any unusual events preceding the problem, etc.

8 Parameters

8.1 Parameter access and reset

Accessing and changing parameters is done in an intuitive manner, as illustrated below:



8.1.1 Real-time display

Normal (real time) display mode allows the key variables listed below to be displayed in real time.

Information type	Letter displayed	Value displayed	Unit of measurement
Estimated speed	–	0 – ±30000	rpm
Output frequency	H	0 – ±500	Hz
Output current	A	0 – 100.0	Amp
Output power	P	0 – 300	kW

The user can scroll between these variables by pressing and releasing the <Navigate> key within 1 second. The scrolling mechanism rolls over from motor current back to speed.

8.1.2 Parameter access mode

To enter the *parameter access mode*, press the <Navigate> button for more than 1 second. The display changes from indicating operational speed to "PX-XX", where X-XX represents the parameter last accessed during the previous commissioning session. The value of X-XX can be incremented or decremented using the <up> / <down> keys. The parameter scrolling mechanism rolls over from the max. to min. parameter number and vice versa.

Pressing and releasing the <Navigate> key once more will then display the current value of the selected parameter. This can then be edited within the limits of that parameter, unless *parameter write access* has been disabled (P2-38).

Pressing the <Navigate> key once more toggles back to display the parameter number in case further editing is required.

If the <Navigate> key is held for approx. 1 second, the display reverts to displaying the real-time values (speed / frequency or current / load). The display will also revert to displaying the selected real-time value if no buttons are pressed for > 30 seconds in P1-01 – P4-10. This does not apply to parameters P0-01 – P0-30, in which the drive remains in parameter access mode.

The parameters are split into standard parameters (e.g. max / min speed), which can be accessed in the basic menu, and advanced parameters, which can be accessed in the extended menu.

8.2 Parameter specifications:

8.2.1 Standard parameters

Par.	Title	Range	Default	Description
P1-01	Max speed limit (Hz or rpm)	P1-02 – 5 × P1-09 (up to 500 Hz max.)	50.0 Hz (60 Hz)[1]	Sets the maximum speed limit. Display of Hz or rpm dependent on P1-10. Maximum speed limit dependent on switching frequency: Max Limit = P2-24 / 16.
P1-02	Min speed limit (Hz or rpm)	0 – P1-01	0.0 Hz	Minimum speed limit. Hz or rpm display depending on P1-10.
P1-03	Acceleration ramp time (s)	0.0 s … 3000 s	5.0 s	Time to ramp from 0 to rated frequency (P1-09)
P1-04	Deceleration ramp time (s)	0.0 s … 3000 s	5.0 s	Time to ramp from rated frequency (P1-09) to 0. If a braking resistor is not fitted the ramp time will be extended automatically to prevent an over-voltage trip.
P1-05	Stop mode select	0: Ramp to stop 1: Coast to stop 2: Ramp to stop	0: Ramp to stop	If the supply is lost and P1-05 = 0 then the drive will try to continue running by reducing the speed of the load using the load as a generator. If P-05 = 2, the drive ramps on 2nd deceleration ramp P2-25 to stop.
P1-06	Energy optimisation (V/f mode only)	0: Disable 1: Enable	0	When enabled, automatically reduces applied motor voltage on light load.
P1-07	Motor rated voltage	20 V – 250 V 20 V – 500 V 20 V – 600 V	230 V 400 V (460 V)[1] 575 V	Set to motor rated voltage from nameplate. Range limited to 250 V for 230 V drives. Rated (nameplate) voltage of the motor in volts. The value is limited to 250 V for low voltage drives. Setting to 0 disables voltage compensation.
P1-08	Motor rated current limit	20 % to 100 % of drive related current	Drive rating	Set to motor rated current from nameplate (Amps).
P1-09	Motor rated frequency	25 – 500 Hz	50.0 Hz (60.0 Hz)[1]	Set to motor rated frequency from nameplate (Hz). Maximum limit dependent on switching frequency: Max Limit = P2-24 / 16.
P1-10	Motor rated speed	0 – 30000 rpm	0	When not set to 0 all speed-related parameters are displayed in rpm.
P1-11	Preset speed 1	–P1-01 – P1-01	50 Hz (60 Hz)[1]	Sets jog / preset speed at which drive runs when preset speed 1 selected via digital inputs (see P2-01).
P1-12	Terminal / Keypad control of drive	0: Terminal control 1: Keypad control (fwd only) 2: Keypad control (fwd and rev) 3: Enable user PID 4: Enable MODBUS network control	0: Terminal control	Set to 0 for terminal control. Set to 1 for uni-directional keypad / slave control. Set to 2 for bi-directional keypad / slave control. Keypad <start> key toggles between forward and reverse. User PID (feedback control) set in parameter group 3. Drive controlled via integrated MODBUS RTU interface.
P1-13	Trip log	Last 4 trips stored	–	Latest 4 trips stored. Most recent displayed first.
P1-14	Extended menu access code	0 – 30000	0	Permits access to extended menu when P1-14 = P2-37. Default access value = 101.

1) If the default value is 60 Hz (460 V), this is shown on the name plate as 60 Hz.

8.2.2 Extended parameters

Par.	Description	Range		Default	Explanation
P2-01	Digital input function select	0 – 22		0	Defines the function of the digital inputs.
P2-02	Preset speed 2	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 2
P2-03	Preset speed 3	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 3
P2-04	Preset speed 4	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 4
P2-05	Preset speed 5	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 5
P2-06	Preset speed 6	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 6
P2-07	Preset speed 7	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 7
P2-08	Preset speed 8	–P1-01 – +P1-01		0.0 Hz	Sets jog / preset speed 8
P2-09	Skip frequency	P1-02 – P1-01		0.0 Hz	Centre point of skip frequency band set up in conjunction with P2-10.
P2-10	Skip frequency band	0 – P1-01		0.0 Hz (disable)	Width of skip frequency band centred on the frequency set in P2-09.
P2-11	Analog output / Digital output 1 Function select	(Digital output mode)		7	Digital output mode. Logic 1 = DC +24 V
		0:	Drive enabled		0: Logic 1 when drive enabled (running)
		1:	Drive healthy		1: Logic 1 when no fault condition exists on the drive
		2:	Motor at target speed		2: Logic 1 when motor speed matches set-point speed
		3:	Motor speed > 0		3: Logic 1 when motor runs above zero speed
		4:	Motor speed ≥ limit		4 - 6: Digital output enabled using level set in P2-12h and P2-12L
		5:	Motor torque ≥ limit		
		6:	2nd analog input ≥ limit		
		(Analog output mode)			(Analog output mode)[1]
		7:	Motor speed		7: Motor speed, 0 – 10 V = 0 – P-01
		8:	Motor torque		8: Motor torque, 0 – 10 V = 0 – 200 % of motor rated torque
		9:	Motor power (kW)		9: Motor power, 0 – 10 V = 0 – 150 % of drive rated power
		10:	Motor current		10: Motor current, 0 – 10 V = 0 – 200 % of P1-08
P2-12(h)	Digital output control high limit	Speed : 0 – 200 % (200 % = max speed) Torque : 0 – 200 % (200 % = rated torque) PID feedback : 0 – 200 % (200 % = max 2nd analog input)		100 %	Digital output state set to logic 1 when selected value in P2-11 is larger than this limit. Limit in P2-12 relates to speed if P2-11 = 4, to motor torque if P2-11 = 5 or to the PID feedback value (2nd analog input) if P2-11 = 6.
P2-12(L)	Digital output control low limit	0 … P2-12(h)		100 %	Digital output state back to logic 0 when the selected value in P2-11 is less than or equal to this limit. (P2-11 = 4,5 or 6)
P2-13	User relay output function select	0:	Drive Enabled	1	If P2-15 = 0 (Normally Open), the relay contacts are closed when the selected condition is fulfilled. If P2-15 = 1 (Normally Closed), the relay contacts are open when the selected condition is fulfilled.
		1:	Drive healthy		
		2:	Motor at target speed		
		3:	Motor speed > 0		
		4:	Motor speed ≥ limit		
		5:	Motor torque ≥ limit		
		6:	2nd analog input ≥ limit		

1) Analog output format refers to P2-36

Par.	Description	Range		Default	Explanation
P2-14(h)	User relay output control high limit	Speed : 0 – 200 % (200 % = max speed) Torque : 0 – 200 % (200 % = rated torque) PID feedback : 0 – 200 % (200 % = max 2nd analog input)		100 %	User relay output closes (P2-15=0) when the selected value in P2-13 is larger than this limit. Limit in P2-14 relates to speed if P2-13 = 4, to motor torque if P2-13 = 5 or to the PID feedback value (2nd analog input) if P2-13 = 6.
P2-14(L)	User relay output control low limit	0 … P2-14(h)		100 %	Digital output state back to logic 0 when selected value in P2-13 less than or equal to this limit. (P2-13 = 4,5 or 6)
P2-15	Relay output mode	0:	Normally Open (NO)	0 (NO)	The drive must be powered up for the relay contacts to be closed.
		1:	Normally Closed (NC)		
P2-16	Zero Speed holding time	0 – 60 s		0.2 s	Determines the time for which the zero speed is held on the output before disabling the drive.
P2-17	Start mode select	Edgr-r	Close digital input 1 after power up to start drive	Auto-0	When set to Edge-r, if drive is powered up with digital Input 1 closed (enabled), drive will not run. The switch (digital input 1) must be opened and closed after power up or after a clearing a trip for the drive to run. When set to Auto-0, drive will run whenever digital input 1 is closed (if not tripped). Auto-1 – 5 makes 1 – 5 attempts to automatically restart after a trip (20 s between attempts in default). The drive must be powered down to reset the counter.
		Auto-0	Drive runs whenever digital input 1 is closed		
		Auto-1 – 5	As Auto-0, except 1 – 5 attempts to restart after a trip.		
P2-18	Spin Start Enable (V/f mode only)	0:	Disable	0	When enabled, the drive detects the motor speed and starts driving the motor from this speed (the motor speed can be in both directions: forward or reverse). A short delay of approx. 1 s will result after enabling the drive before the speed is detected. This function only works when parameter P4-01 = 2.
		1:	Enable		
P2-19	Keypad restart mode	0:	Minimum speed	1	If set to 0 or 2, the drive will always start from minimum speed. If set to 1 or 3, the drive ramps up to the operating speed prior to the last STOP command. If set to 2 and 3, the status of digital input 1 controls the drive to start or stop. The start and stop button will not work in this case.
		1:	Previous speed		
		2:	Min-speed (Auto-r)		
		3:	Previous speed (Auto-r)		
P2-20	Standby mode	0: Disable 1 – 60 s		0.0 s	If P2-20 > 0, the drive enters standby mode (disables output) if minimum speed is maintained for the time specified in P2-20. If P2-16 > 0, this function is disabled.
P2-21	Display scaling factor	0.000 – 30.000		0.000	Disabled if set to 0. The variable selected in P2-22 is multiplied by this factor and displayed as a real-time value on the drive, in addition to speed, current and power.
P2-22	Display scaling source	0:	2nd analog input	0	Selects the variable to be scaled by the factor set in P2-21.
		1:	Motor speed		
		2:	Motor torque		
		3:	Motor current		

Par.	Description	Range		Default	Explanation
P2-23	Brake circuit enable	0:	Disable	0	Enables the internal brake chopper. Overload protection in software when set to 1 or 2. See rating tables for resistor sizing guidelines.
		1:	Enable + lo power		
		2:	Enable + hi power		
		3:	Enable, no protection		
P2-24	Effective switching frequency	S1, S2	230 V, 4 – 32 kHz	16 kHz	Effective power stage switching frequency. Higher switching frequency means less noise development on the motor but higher losses at output stage.
		S2	400 V, 4 – 32 kHz	8 kHz	
		S3, S4	400 V, 4 – 24 kHz	4 kHz	
		S5, S6	400 V, 4 – 16 kHz	4 kHz	
		Auto			"Auto" selects minimum possible switching frequency for the speed range selected to minimize losses in spindle applications. (P2-24 must be 16 × P1-01 or greater.)
P2-25	Second deceleration ramp time	0 s – 3000 s		0.0 s	Selected automatically on mains loss if P1-05 = 2. Can also be selected via digital inputs during operation.
P2-26	MODBUS communication baudrate	t9.6, t19.2, t38.4, t57.6, t115.2 r9.6, r19.2, r38.4, r57.6, r115.2		0 Kbaud	MODBUS RTU serial data link communication baudrate. A 't' suffix indicates the drive will trip if communication with the network master is lost. An 'r' suffix indicates that the drive will ramp to stop if communication with the network master is lost.
P2-27	Drive communication address	0:	Disable	1	Distinct drive address used for all drive serial communications.
		1 – 63:	Communication address		
P2-28	Master / Slave mode select	0:	Slave mode	0	When in Master mode, the drive transmits its operational status via the serial data link. Used to control slave drives via the serial link. P2-27 must be 1 for Master mode.
		1:	Master mode		
P2-29	Digital speed reference preset scaling factor	0 – 500 %, steps of 0.1 %		100.0 %	The digital speed reference input to the drive is scaled by this factor when P2-35 = 1. Operates on references originating from the serial data link. Can be used as an electronic gearbox for Master / Slave applications.
P2-30	Bipolar analog input format	0 – 24 V 0 – 10 V –10 – 10 V –24 – 24 V		0 – 24 V	Configures the analog input format to match the reference signal connected to terminal 6. Only voltage signals can be directly connected, mA reference signals require an external resistor connection.
P2-31	Bipolar analog input scaling	0 – 500 %		100.0 %	Scales the analog input by this factor. Set to 200 % to give full speed range control with 0 – 5 V input (when P2-30 = 0 – 10 V).
P2-32	Bipolar analog input offset	–500 % – +500 %		0.0 %	Sets the offset from 0 at which speed starts to ramp up. Value is "%" of the full scale input voltage.
P2-33	2nd analog input format	0 / 24 V (digital input) 0 – 10 V, 4..20 mA, 0 – 20 mA		0 / 24 V	Determines the format of the 2nd analog input.Selecting 0 / 24 V sets up the input as a digital input.
P2-34	2nd analog input scaling	0 – 500 %		100.0 %	Scales the 2nd analog input by the factor set in this parameter.

Par.	Description	Range		Default	Explanation
P2-35	Digital speed reference scaling control	0:	Disabled (no scaling)	0	Only active in keypad mode (P1-12 = 1 or 2) and Master / Slave mode. 1: Actual speed = digital speed × P2-29 2: Actual speed = (digital speed × P2-29) + bipolar analog reference 3: Actual speed = (digital speed × P2-29) × bipolar analog reference
		1:	Scaled by P2-29		
		2:	Scaled by P2-29, bipolar with analog input added as offset		
		3:	Scaled by P2-29 *and* by bipolar analog input		
P2-36	Analog output format	0 – 10 V, 4 – 20 mA, 10 – 0 V, 20 – 4 mA		0 – 10 V	Determines the analog output format. Min load impedance in voltage mode: 1 kΩ Max load impedance in current mode: 1 kΩ
P2-37	Extended menu access code define	0 – 9999		101	Defines the extended menu access code used in P1-14.
P2-38	Parameter Lock	0:	Unlocked	0	When locked, all parameter changes are prevented.
		1:	Locked		
P2-39	Hours run clock	0 – 99999 hours		Read only	Indicates the number of hours the drive has been running since new.
P2-40	Drive type / rating	–		Read only	Indicates drive power rating, type code and voltage rating.

8.2.3 User feedback control (PID control)

Par.	Description	Range	Default	Explanation
P3-01	Proportional gain	0.1 – 30.0	2	PID Controller Proportional Gain. Higher values provide a greater change in the drive output frequency in response to small changes in the feedback signal. Too high a value can cause instability.
P3-02	Integral time constant	0.0 s – 30.0 s	1 s	PID Controller Integral Time. Higher values provide a more damped response for systems where the overall process responds slowly.
P3-03	Differential time constant	0.00 s – 1.00 s	0.00	Can be set to zero (disabled) for most applications.
P3-04	PID operating mode	0: Direct 1: Inverse	0	Direct operation: Motor speed *increases* with an increase in the feedback signal. Inverse operation: Motor speed *decreases* with an increase in the feedback signal.
P3-05	PID Setpoint / reference select	0: Digital 1: Analog	0	Sets the source for the PID reference / setpoint. 0: P3-06 is used 1: Bipolar analog input is used
P3-06	PID digital reference	0 – 100 %	0.0 %	Sets the preset digital PID reference / setpoint.
P3-07	PID controller high limit output	P3-08 – 100 %	100 %	Limits the maximum value output from the PID controller.
P3-08	PID controller low limit output	0 – P3-07	0.0 %	Limits the minimum output from the PID controller.
P3-09	PID output limit / function control	0: Digital output limits 1: Analog upper limit 2: Analog lower limit 3: PID output + biploar analog input reference	0	0: PID output range limited by P3-07 & P3-08 1: PID maximum output limited by signal applied to the bipolar analog input. 2: PID minimum output limited by signal applied to the bipolar analog input 3: PID output added to speed reference applied to the bipolar analog input
P3-10	PID feedback source select	0: 2nd analog input 1: Bipolar analog input	0	Selects the source of the PID feedback signal.

8.2.4 High performance motor control

Par.	Description	Range	Default	Explanation
P4-01	Control mode	0: Speed control (vector) 1: Torque control (vector) 2: Speed control (V/f)	2	Whenever changing control mode, ensure that an auto-tune (P4-02) is always carried out for best motor performance. Set to 0 for speed control with variable torque limits.
P4-02	Motor parameter auto-tune	0: Disable 1: Enable	0	When set to 1, drive immediately carries out a static (non-rotating) motor parameter measurement operation to configure the motor parameters. P1-07, P1-08 and P1-09 must be set correctly according to the motor nameplate before enabling this function. Auto-tune runs automatically on first enable after parameter default operation and P1-08 have been changed. No hardware enable is required.
P4-03	Speed controller Proportional gain	0 – 4096 (internal value)	Drive rating	Too high a value can cause instability. Only available in vector mode.
P4-04	Speed controller Integral time constant	0.000 – 1.000 s	0.05 s	Higher value gives slower, more damped response. Only available in vector mode.
P4-05	Motor factor power	0.50 – 0.99	Drive rating	Motor nameplate power factor (cos Φ). Required for all vector control modes.
P4-06	Torque reference select	0: Preset value 1: Bipolar analog input 2: 2nd analog input 3: MODBUS ref	0	Used when in vector control mode to set a maximum torque limit.
P4-07	Torque reference preset value	0 – 200 %	200.0 %	Preset value used when P4-06 = 0. 100 % is rated motor torque.
P4-08	Minimum torque reference limit	0 –150 %	0.0 %	Defines the minimum limit for output motor torque
P4-09	V/f characteristic adjustment frequency	0 – P1-09	0.0 Hz	Sets the frequency at which the adjustment voltage (P4-10) is applied.
P4-10	V/f characteristic adjustment voltage	0 – P1-07	0	Sets the motor voltage to this value at the frequency set in P4-09.

8.3 Selection of Parameter P2-01, Digital Input Function

The functionality of the digital inputs within the MOVITRAC® LTP is user programmable, allowing the user to select the functions required for the application.

The following tables define the functions of the digital inputs depending on the value of parameter P1-12 (Terminal / keypad control) and P2-01 (Selection of digital input function).

8.3.1 Selection table if P1-12 = 0 (Terminal mode)

P2-01	Digi input 1 (DI1)	Digi input 2 (DI2)	Digi input 3 (DI3)	Analog input (AI)	Comments / Preset value
0	O: Stop (Disable) C: Run (Enable)	O: Analog input C: Preset speed 1, 2	O: Preset speed 1 C: Preset speed 2	Bipolar analog input	DI3 selects speed if DI2 is closed
1	O: Stop (Disable) C: Run (Enable)	O: Preset speed 1 C: Preset speed 2	O: Preset speed 1, 2 C: Preset speed 3	O: Preset speed 1,2,3 C: Preset speed 4	–
2	O: Stop (Disable) C: Run (Enable)	Open	Open	Open	Preset speed 1
		Closed	Open	Open	Preset speed 2
		Open	Closed	Open	Preset speed 3
		Closed	Closed	Open	Preset speed 4
		Open	Open	Closed	Preset speed 5
		Closed	Open	Closed	Preset speed 6
		Open	Closed	Closed	Preset speed 7
		Closed	Closed	Closed	Preset speed 8
3	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	O: Analog input C: Preset speed 1	Bipolar analog input	–
4	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	2nd analog input	Bipolar analog input	P4-06 = 0 or 1 speed reference at 2nd analog input P4-06 = 2 bipolar input is speed reference, 2nd analog input is torque ref. P2-36 sets format of DI3
5	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	Open	Open	Preset speed 1
			Closed	Open	Preset speed 2
			Open	Closed	Preset speed 3
			Closed	Closed	Preset speed 4
6	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	External trip input: O: Trip C: OK	Bipolar analog input	Connect an external PTC motor thermistor or similar to DI3
7	O: Stop (Disable) C: Run Forward	O: Stop (Disable) C: Run Reverse	O: Analog input C: Preset speed 1	Bipolar analog input	–
8	O: Stop (Disable) C: Run Forward	O: Stop (Disable) C: Run Reverse	O: Preset speed 1 C: Analog input	Bipolar analog input	–
9	O: Stop (Disable) C: Run Forward	O: Stop (Disable) C: Run Reverse	Open	Open	Preset speed 1
			Closed	Open	Preset speed 2
			Open	Closed	Preset speed 3
			Closed	Closed	Preset speed 4

P2-01	Digi input 1 (DI1)	Digi input 2 (DI2)	Digi input 3 (DI3)	Analog input (AI)	Comments / Preset value
10	O: Stop (Disable) C: Run Forward	O: Stop (Disable) C: Run Reverse	External trip input: O: Trip C: OK	Bipolar analog input	Connect an external PTC motor thermistor or similar to DI3
11	O: Stop (Disable) C: Run (Enable)	O: Analog input C: Preset speed 1	External trip input: O: Trip C: OK	Bipolar analog input	Connect an external PTC motor thermistor or similar to DI3
12	O: Stop (Disable) C: Run (Enable)	O: Preset speed 1 C: Analog input	External trip input: O: Trip C: OK	Bipolar analog input	Connect an external PTC motor thermistor or similar to DI3
13	Normally Open (NO) Momentarily close to run forward	Normally Closed (NC) Momentarily open to run	O: Analog input C: Preset speed 1	Bipolar analog input	–
14	Normally Open (NO) Momentarily close to run forward	Normally Closed (NC) Momentarily open to stop	Normally Open (NO) Momentarily close to run reverse	Bipolar analog input	–
15	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	O: Decel ramp 1 C: Decel ramp 2	Bipolar analog input	–
16	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	O: Decel ramp 1 C: Decel ramp 2	O: Preset speed 1 C: Preset speed 2	–
17	Normally Open (NO) Momentarily close to run forward	Normally Closed (NC) Momentarily open to stop	Normally Open (NO) Momentarily close to run reverse	O: Preset speed 1 C: Keypad mode	Up and Down buttons can be used to set the speed when analog input is set to keypad mode.
18	O: Stop (Disable) C: Run (Enable)	Open	Open	O: Terminal mode C: Keypad mode	Preset speed 1
		Closed	Open		Preset speed 2
		Open	Closed		Preset speed 3
		Closed	Closed		Preset speed 4
19	O: Stop (Disable) C: Run (Enable)	O: Analog input C: 2nd analog input	2nd analog input	Bipolar analog input	–
20	O: Stop (Disable) C: Run (Enable)	2nd digital output (+24 V)	O: Analog input C: Preset speed 1	Bipolar analog input	2nd digital output shows drive healthy
21	O: Stop (Disable) C: Run (Enable)	2nd digital output (+24 V)	O: Forward C: Reverse	Bipolar analog input	2nd digital output shows drive healthy
22	O: Stop (Disable) C: Run (Enable)	2nd digital output (+24 V)	External trip input: O: Trip C: OK	Bipolar analog input	2nd digital output shows drive healthy

TIP

When P2-01 = 20, the 2nd digital input is configured as an output, which outputs +24 V when the drive is healthy. If the drive is not healthy, the output will be 0 V.

When connecting a motor thermistor, connect it between terminals 1 and 4.

Set P2-01 to 6, 10, 11, 12 or 22 (uses external trip input).

8.3.2 Selection table if P1-12 = 1 or 2 (Keypad mode)

P2-01	Digital input 1 (DI1)	Digital input 2 (DI2)	Digital input 3 (DI3)	Analog input (AI)	Comments / Preset value
0	O: Stop (Disable) C: Run (Enable)	C: Increase speed	C: Decrease speed	No effect	Close DI2 & DI3 simultaneously to start drive.
1	O: Stop (Disable) C: Run (Enable)	C: Increase speed	External trip input: O: Trip C: OK	C: Decrease speed	Close DI2 & analog input simultaneously to start drive. Connect an external PTC motor thermistor or similar to DI3.
2	O: Stop (Disable) C: Run (Enable)	C: Increase speed	O: Digital speed ref C: Preset speed 1	Analog input > 5 V reverses rotation.	Reverse operation only available in P1-12 = 2.
3 – 9, 13, 14, 16 [1]	O: Stop (Disable) C: Run (Enable)	C: Increase speed	C: Decrease speed	O: Forward C: Reverse	Close DI2 & DI3 simultaneously to start drive.
10	O: Stop (Disable) C: Run (Enable)	O: Digital speed ref C: Analog input	External trip input: O: Trip C: Run	Analog speed ref	Connect an external PTC motor thermistor or similar to DI3.
11	O: Stop (Disable) C: Run (Enable)	O: Digital speed ref C: Preset speed 1	External trip input: O: Trip C: Run	Analog input > 5 V reverses rotation.	Connect an external PTC motor thermistor or similar to DI3.
12	O: Stop (Disable) C: Run (Enable)	O: Preset speed 1 C: Analog input	External trip input: O: Trip C: Run	Analog input > 5 V reverses rotation.	Connect an external PTC motor thermistor or similar to DI3.
15	O: Stop (Disable) C: Run (Enable)	O: Digital speed ref C: Preset speed 1	O: Decel ramp 1 C: Decel ramp 2	Analog input > 5 V reverses rotation.	–
17	O: Stop (Disable) C: Run (Enable)	O: Digital speed ref C: Analog input	O: Digital / analog speed C: Preset speed 1	Analog speed ref	DI3 overrides DI2.
18	O: Stop (Disable) C: Run (Enable)	O: Digital speed ref C: Preset speed	Open	Open	Preset speed 1
			Closed	Open	Preset speed 2
			Open	Closed	Preset speed 3
			Closed	Closed	Preset speed 4
19	O: Stop (Disable) C: Run (Enable)	O: Digital speed ref C: 2nd analog input	No effect	Analog input > 5 V reverses rotation.	–
20, 21	O: Stop (Disable) C: Run (Enable)	2nd digital output: (+24 V)	O: Digital speed ref C: Preset speed 1	Analog input > 5 V reverses rotation.	2nd digital output shows drive healthy.
22	O: Stop (Disable) C: Run (Enable)	2nd digital output: (+24 V)	External trip input: O: Trip C: Run	Analog input > 5 V reverses rotation.	Connect an external PTC motor thermistor or similar to DI3. 2nd digital output shows drive healthy.

1) In addition to the speed being set using the pushbuttons on the front of the drive, these settings allow the speed to be controlled remotely using remote pushbuttons connected to digital inputs 1, 2 and 3.

When P2-01 = 17 or 18, keypad mode is selected from within terminal mode (see chapter "Selection table if P1-12 = 0 (Terminal mode)" on page 47). For this reason, the remaining digital inputs have no effect.

When P2-19 = 2 or 3 in keypad mode, the drive start and stop is controlled from the hardware enable input (terminal 2). In this case, the <start> / <stop> buttons are not required and therefore have no effect.

Reverse rotation control by analog input only works when P1-12 = 2.

When connecting a motor thermistor, connect it between terminals 1 & 4 and set P2-01 to 6, 10, 11, 12 or 22 (uses external trip output).

8.3.3 Selection table if P1-12 = 3 (User PID mode)

The following table defines the function of the digital inputs when the drive is in User PID control mode (set using P1-12 = 3).

P2-01	Digital input 1 (DI1)	Digital input 2 (DI2)	Digital input 3 (DI3)	Analog input (AI)	Comments
0 – 10, 13 – 18	O: Stop (Disable) C: Run (Enable)	No effect	No effect	Bipolar analog input	–
11	O: Stop (Disable) C: Run (Enable)	O: PID control C: Preset speed 1	External trip input: O: Trip C: Run		Connect an external PTC motor thermistor or similar to DI3. P3-10 = 1 for external trip.
12	O: Stop (Disable) C: Run (Enable)	O: Preset speed 1 C: PID control	External trip input: O: Trip C: Run		Connect an external PTC motor thermistor or similar to DI3. P3-10 = 1 for external trip.
17	O: Stop (Disable) C: Run (Enable)	O: PID control C: Analog input	No effect		–
19	O: Stop (Disable) C: Run (Enable)	O: PID control C: 2nd analog input	2nd analog input		–
20, 21	O: Stop (Disable) C: Run (Enable)	2nd digital output: (+24 V)	No effect		2nd digital output shows drive healthy.
22	O: Stop (Disable) C: Run (Enable)	2nd digital output: (+24 V)	External trip input: O: Trip C: Run		Connect an external PTC motor thermistor or similar to DI3. P3-10 = 1 for external trip. 2nd digital output shows drive healthy.

8.3.4 Selection table if P1-12 = 4 (MODBUS control)

The following table defines the function of the digital inputs when the drive is in MODBUS control mode (set using P1-12 = 4).

P2-01	Digital input 1 (DI1)	Digital input 2 (DI2)	Digital input 3 (DI3)	Analog input (AI)	Comments
0, 1, 2, 4 6 – 9, 13, 15, 18	O: Stop (Disable) C: Run (Enable)	No effect	No effect	No effect	–
3	O: Stop (Disable) C: Run (Enable)	O: Forward C: Reverse	O: Master speed ref C: Preset speed 1	No effect	–
5	O: Stop (Disable) C: Run (Enable)	O: Master speed ref C: Preset speed 1	Open	Open	Preset speed 1
			Closed	Open	Preset speed 2
			Open	Closed	Preset speed 3
			Closed	Closed	Preset speed 4
10	O: Stop (Disable) C: Run (Enable)	O: Master speed ref C: Digital speed ref	External trip input: O: Trip C: Run	No effect	Connect an external PTC motor thermistor or similar to DI3.
11	O: Stop (Disable) C: Run (Enable)	O: Master speed ref C: Preset speed 1	External trip input: O: Trip C: Run	No effect	Connect an external PTC motor thermistor or similar to DI3.
12	O: Stop (Disable) C: Run (Enable)	O: Master speed ref C: Analog speed ref	External trip input: O: Trip C: Run	Analog speed reference	Connect an external PTC motor thermistor or similar to DI3.
17	O: Stop (Disable) C: Run (Enable)	O: Master speed ref C: Analog speed ref	O: Master / analog input speed ref C: Preset speed 1	Analog speed reference	If DI3 is closed, DI2 has no effect.
19	O: Stop (Disable) C: Run (Enable)	O: Master speed ref C: 2nd analog input	2nd analog input	No effect	–
20, 21	O: Stop (Disable) C: Run (Enable)	2nd digital output: (+24 V)	O: Master speed ref C: Preset speed 1	No effect	2nd digital output shows drive healthy.
22	O: Stop (Disable) C: Run (Enable)	2nd digital output: (+24 V)	External trip input: O: Trip C: Run	No effect	Connect an external PTC motor thermistor or similar to DI3. 2nd digital output shows drive healthy.

TIP

If P2-19 = 2 or 3, the drive can only be started or stopped by closing or opening digital input 1.

If P2-19 = 0 or 1, the master speed reference will be automatically reset to 0 each time the drive is stopped.

8.3.5 Real-time monitoring parameters

Parameter group zero provides access to internal drive parameters for monitoring purposes. These parameters cannot be adjusted.

Par.	Description	Display range	Explanation
P0-01	Bipolar analog input value	–100 % – 100 %	100 % = max input voltage
P0-02	2nd analog input value	0 – 100 %	100 % = max input voltage
P0-03	Speed controller reference	–500 % – 500 %	100 % = Base frequency (P1-09)
P0-04	Digital speed ref (digi pot)	– P1-01 – P1-01	Speed displayed in Hz / rpm
P0-05	Torque controller reference	0 – 200 %	100 % = motor rated torque
P0-06	User PID ref input	0 – 100 %	PID controller reference value
P0-07	User PID feedback	0 – 100 %	PID controller feedback value
P0-08	User PID error input	0 – 100 %	Reference – Feedback
P0-09	User PID P-term	0 – 100 %	Proportional component
P0-10	User PID I-term	0 – 100 %	Integral component
P0-11	User PID D-term	0 – 100 %	Differential component
P0-12	User PID output	0 – 100 %	Combined output
P0-13	Output Torque	0 – 200 %	100 % = motor rated torque
P0-14	Magnetizing current	A rms	Magnetizing current in A rms
P0-15	Rotor current	A rms	Rotor current in A rms
P0-16	Field strength	0 – 100 %	Magnetic field strength
P0-17	Stator resistance	Ohm [Ω]	Phase - Phase stator resistance
P0-18	Stator inductance	H	Stator inductance in Henry
P0-19	Rotor resistance	Ohm [Ω]	Calculated rotor resistance
P0-20	DC bus voltage	V DC	Internal DC bus voltage
P0-21	Drive temperature	°C	Internal drive temperature
P0-22	Supply voltage L1 – L2	V rms, ph-ph	Phase – phase supply voltage
P0-23	Supply voltage L2 – L3	V rms, ph-ph	Phase – phase supply voltage
P0-24	Supply voltage L3 – L1	V rms, ph-ph	Phase – phase supply voltage
P0-25	Estimated Rotor speed	Hz or rpm	Applies to vector modes only
P0-26	kWh meter	0.0 … 999.9 kWh	Cumulative energy consumption
P0-27	MWh meter	0.0 … 60000 MWh	Cumulative energy consumption
P0-28	Software ID, IO processor	e.g. “1.00”, “493F”	Version number and check sum
P0-29	Software ID, Motor control	e.g. “1.00”, “7A5C”	Version number and check sum
P0-30	Drive serial number	000000 … 999999 00-000 … 99-999	Unique drive serial number e.g. 540102 / 24 / 003

9 Software

9.1 MODBUS Control

9.1.1 Specification

The following table highlights the specification for the MODBUS RTU implementation in MOVITRAC® LTP.

Protocol	MODBUS RTU
Error check	CRC
Baud rate	9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps (default)
Data format	1 start bit, 8 data bits, 1 stop bit, no parity
Physical signal	RS-485 (2-wire)
User interface	RJ11

9.1.2 Memory map

Register	Upper byte	Lower byte	Command	Type
1	Command	–	03,06	Read / Write
2	Speed reference	–	03,06	Read / Write
3	Torque reference	–	03,06	Read / Write
4	Acceleration ramp time	Deceleration ramp time	03,06	Read / Write
5	Reserved	–	03	Read only
6	Error code	Drive status	03	Read only
7	Motor speed	–	03	Read only
8	Motor current	–	03	Read only
9	Motor torque	–	03	Read only
10	Motor power	–	03	Read only
11	Digital input status	–	03	Read only

9.1.3 Register description

Type	Register no.	Register title	Description	
Read / Write	1	Drive command	0: CMD	Drive command setup: 00: stop, 01: start, 10: reset
			1: CMD	
			2: 2nd	2nd deceleration ramp select flag
			3 – 15: Reserved	Reserved
	2	Speed reference setup	This register holds the speed reference value with one decimal place (200 = 20.0 Hz). The maximum speed reference value is limited by P1-01.	
	3	Torque reference setup	This register holds the torque reference with one decimal place (450 = 45.0 %). The data range is from 0 (0 %) to 2000 (200.0 %). This torque reference is only active when P4-06 = 3 and the drive is in vector control mode.	
	4	Acceleration / deceleration ramp setup	Low byte: Acceleration ramp time High byte: Deceleration ramp time (Range: 0 – 255)	-0M-version
			Controls acceleration and deceleration time simultaneously. (Range: 0 – 6000)	-00-version
			Ramp time in seconds × 10 (e.g. 100 = 10.0 s)	
Read only	6	Drive status and error code	High byte gives the drive error code (valid when the drive is tripped). Low byte gives the drive status (0: drive stopped, 1: drive running, 2: drive tripped).	
	7	Motor speed information	This register gives motor speed information. The data is in Hz and with one decimal place (e.g. 234 = 23.4 Hz).	
	8	Motor current	This register gives motor current information. The data is in Amps with one decimal place (e.g. 87 = 8.7 A).	
	9	Motor torque	This register gives motor output torque information. It is a percentage value as 100.0 % equals motor rated torque. The data value is stated to one decimal place.	
	10	Motor power	This register gives motor power information and the data is stated to 2 decimal places (e.g. 124 = 1.24 KW / HP). The data unit depends on the drive type.	
	11	Digital input status	The value in this register represents the drive terminal digital input status (digital input 1 – 4). The lowest bit indicates digital input status 1.	

9.1.4 Monitor value registers

These registers are read only with command 03.

Address	Description	Data format	Example
21	Bipolar analog input value	1 decimal place	156 = 15.6 %
22	2nd analog input value	1 decimal place	156 = 15.6 %
23	Speed control reference	–	156 = 156 %
24[1)]	Digital speed reference	Internal value	–
25	Motor torque reference	–	2000 = 200.0 %
26	User PID reference	1 decimal place	156 = 15.6 %
27	User PID feedback	1 decimal place	156 = 15.6 %
28	User PID error input	1 decimal place	156 = 15.6 %
29	User PID P term output	1 decimal place	156 = 15.6 %
30	User PID I term output	1 decimal place	156 = 15.6 %
31	User PID D term output	1 decimal place	156 = 15.6 %
32	User PID output	1 decimal place	156 = 15.6 %
33	Motor output torque	–	1000 = 100.0 %

Address	Description	Data format	Example
34	Magnetizing current	1 decimal place	156 = 15.6 A
35	Rotor current	1 decimal place	156 = 15.6 A
36	Field strength	1 decimal place	156 = 15.6 %
37	Stator resistance	3 decimal places	156 = 0.156 ohm
38	Stator inductance	4 decimal places	156 = 0.0156 h
39	Rotor resistance	3 decimal places	156 = 0.156 ohm
40	DC bus voltage	–	256 = 256 V
41	Drive temperature	–	23 = 23 °C
42	Supply voltage L1	–	230 = 230 V
43	Supply voltage L2	–	230 = 230 V
44	Supply voltage L3	–	230 = 230 V
45[1)]	Estimated rotor speed	–	Internal value
46	Kwh meter	1 decimal place	156 = 15.6 Kwh
47	Mwh meter	–	156 = 156 Mwh

1) See chapter "Internal value".

9.1.5 Parameter registers

These registers are READ / WRITE registers with support command 03, 06.

Adr	Description	Data range	Data format	Example
129[1)]	Maximum speed limit	0 – 7200	Internal value	–
130[1)]	Minimum speed limit	0 – 7200	Internal value	–
131	Acceleration ramp time	0 – 30000	1 decimal place	300 = 30.0 s
132	Deceleration ramp time	0 – 30000	1 decimal place	300 = 30.0 s
133	Stop mode select	0 – 2	0: Ramp to stop 1: Coast to stop 2: Ramp to stop	–
134	Energy save	0, 1	0: Disable 1: Enable	–
135	Motor rated voltage	20 – 250 (low) 20 – 500 (high)	–	–
136	Motor rated current	Drive dependent	1 decimal place	300 = 30.0 A
137	Motor rated frequency	25 – 500	Data unit in Hz	–
138[1)]	Motor rated speed	0 – 30000	Data unit in RPM	–
139	Preset speed 1	–P1-01 – P1-01	Internal value	–
140	Control mode	0 – 4	0: Terminal 1: Keypad forward only 2: Keypad forward and reverse 3: PID control mode 4: MODBUS control mode	–
141	Trip log	–	Last 4 trips	–
142	Access code	0 – 30000	–	–
143	Digital input function	0 – 22	–	–
144[1)]	Preset speed 2	–P1-01 – P1-01	Internal value	–
145[1)]	Preset speed 3	–P1-01 – P1-01	Internal value	–
146[1)]	Preset speed 4	–P1-01 – P1-01	Internal value	–
147[1)]	Preset speed 5	–P1-01 – P1-01	Internal value	–
148[1)]	Preset speed 6	–P1-01 – P1-01	Internal value	–

Adr	Description	Data range	Data format	Example
149[1)]	Preset speed 7	–P1-01 – P1-01	Internal value	–
150[1)]	Preset speed 8	–P1-01 – P1-01	Internal value	–
151[1)]	Skip frequency 1	–P1-01 – P1-01	Internal value	–
152[1)]	Skip frequency band 1	–P1-02 – P1-01	Internal value	–
153	Analog output function	0 – 10	–	–
	Digital output ctrl. limit (h)	0 – 100	Located in lower byte	–
154	Digital output ctrl. limit (L)	0 – high limit	Located in higher byte	–
155	Relay output function	0 – 6	–	–
	Relay control limit (h)	0 – 100	Located in lower byte	–
156	Relay control limit (L)	0 – high limit	Located in higher byte	–
157	Relay output mode	0 – 1	0: Normally open 1: Normally closed	–
158	Zero speed holding time	0 – 60 s	1 decimal place	600 = 60.0 s
159	Start mode select	0 – 6	0: Edgr-r 1: Auto_0 2 – 6: Auto_1 – Auto_5	–
160	Reserved	0	Read as zero	–
161	Keypad restart mode	0 – 3	–	–
162	Enable standby	0 – 60	Data unit in seconds (s)	–
163	Display scaling factor	0 – 30000	3 decimal places	300 = 0.3.00
164	Display scaling source	0 – 1	0: 2nd analog input 1: Drive speed	–
165	Brake circuit enable	0 – 3	–	–
166	Effective switching freq.	0 – 4 (drive dependent)	0: 4 KHz 1: 8 KHz 2: 16 KHz 3: 24 KHz 4: 32 KHz	–
167	2nd dec. ramp time (s)	0 – 30000	1 decimal place	300 = 30.0 s
168	MODBUS baudrate	0 – 4	0: 9600 bps 1: 19200 bps 2: 38400 bps 3: 57600 bps 4: 115200 bps	
169	Drive comms address	1 – 63	–	–
170	Master / Slave mode	0 – 1	Only for Optibus, not MODBUS	–
171	Speed scaling factor	0 – 5000	1 decimal place	300 = 30.0 %
172	Bipolar analog input format	0 – 2	0: 0 – 24 V 1: 0 – 10 V 2: –10 – 10 V	–
173	Bipolar analog input scaling	0 – 5000	1 decimal place	300 = 30.0 %
174	Bipolar analog input offset	–5000 – 5000	1 decimal place	300 = 30.0 %
175	2nd analog input format	0 – 3	0: 0 / 24 V digital 1: 0 – 10 V 2: 4 – 20 mA 3: 0 – 20 mA	–
176	2nd analog input scaling	0 – 5000	1 decimal place	300 = 30.0 %
177	Digital speed reference scaling control	0 – 3	–	–
178	Analog output format	0 or 3	0: 0 – 10 V 1: 4 – 20 mA 2: 10 – 0 V 3: 20 – 4 mA	–
179	Extended access code	0 – 999	–	–

Adr	Description	Data range	Data format	Example
180	Parameter lock	0 or 1	0: Unlock 1: Locked	–
181	Drive run time	Read only	Read values as hours	–
182	Drive power rating	Read only	Power stated to 2 decimal places	–
183 – 198	Reserved	Read only	Read as zero	–
199	Control mode	0, 1, 2	0: Vector speed control 1: Vector torque control 2: V/f speed control	–
200	Motor parameter auto-tune	0 or 1	–	–
201	Speed controller P-gain	0 – 4096	–	–
202	Speed controller integral time constant	0.001 – 0.100 s	–	1 = 0.001 s
203	Motor power factor	0.50 – 0.99	–	78 = 0.78
204	Torque reference select	0 – 3	0: Digital preset value 1: Bipolar analog input 2: 2nd analog input 3: MODBUS reference	–
205	Maximum torque limit / ref	0 – 200 %	–	100 = 100 %
206	Minimum torque limit	0 – 150.0 %	–	100 = 10.0 %
207	V/f characterisitic adjustment frequency	0 – P1-09	–	500 = 50.0 Hz
208	V/f characterisitic adjustment voltage	0 – P1-07	–	100 = 100 V

1) See chapter "Internal value".

9.1.6 Internal value

For some speed related parameters, the drive uses an internal value instead of the actual speed in Hz in order to increase the resolution. In order to set these speed related parameters correctly, the internal value must be used instead of the display value.

Speed Internal = Speed in Hz × Factor

When P1-09 ≤ 100 Hz	Factor = 60	e.g. 30.5 Hz = 1830
When P1-09 is 101 – 199 Hz	Factor = 30	e.g. 30.5 Hz = 915
When P1-09 ≥ 200 Hz	Factor = 15	e.g. 250 Hz = 3750

9.1.7 Drive error codes

Error code	Description
0x00	No trip
0x01	Brake circuit over current (short circuit)
0x02	Over current
0x03	External trip
0x04	DC bus over voltage trip
0x05	DC bus under voltage trip
0x06	Over temperature trip
0x07	Under temperature trip
0x08	Spin start fault
0x09	Parameter default
0x0A	I*t trip (overload trip)
0x0B	Phase imbalance trip
0x0C	Brake resistor overload
0x0D	Power stage trip
0x0E	Communication link loss trip
0x0F	Phase loss trip
0x10	Thermistor fault
0x11	Auto-tune fault

Dataflow example

MODBUS RTU read data from register 6:

Request	[01] Drive address	[03] Command	[00] [05] Register start address	[00] [01] No. of registers	[94] [0B] Checksum
Reply	[01] Drive address	[03] Command	[02] No. of data bytes	[00] [00] Data	[B8] [44] Checksum

Please note that the start address for register 6 is "5".

9.1.8 Display parameter

In parameter P0-59 the last byte of information received by the drive can be monitored at the drive itself. To display parameter P0-59 you must set P1-14 to "702".

10 Technical data

10.1 Conformance

All products conform to the following international standards:

- UL 508C Power conversion equipment
- EN 61000-6 / -2, -3, -4 Generic immunity / Emission standards (EMC)
- Enclosure protection level according to NEMA 250, EN 60529
- Flammability rating according to UL 94
- cUL Power conversion equipment, certified for Canada

10.2 Environmental

Operational ambient temperature range	0 – 50 °C at default PWM frequency (IP20) 0 – 40 °C at default PWM frequency (IP55, NEMA 12k)
Maximum ambient temperature derating	4 % / °C up to 55 °C for IP20 drives 4 % / °C up to 45 °C for IP55 drives
Storage ambient temperature range	–40 – +60 °C
Maximum altitude for rated operation	1000 m
Derating above 1000 m	1 % / 100 m to max. 2000 m
Maximum relative humidity	95 % (non-condensing)
Protection rating cabinet drive	IP20
Protection rating high enclosure drive	IP55, NEMA 12 k

10.3 Output power and current ratings

10.3.1 1-phase system AC 230 V for 3-phase AC 230 V motors (size 1)

Standard MOVITRAC®		**MC LTP A...**	**0004 2B1 1 -00**	**0008 2B1 1 -00**	**0015 2B1 1 -00**
		Part number	**8286914**	**8286922**	**8299226**
IP55/NEMA 12 housing MOVITRAC®		**MC LTP A...**	**0004 2B1 1 -10**	**0008 2B1 1 -10**	**0015 2B1 1 -10**
		Part number	**8291756**	**8291764**	**8299234**
IP55/NEMA 12 with switch MOVITRAC®		**MC LTP A...**	**0004 2B1 1 -20**	**0008 2B1 1 -20**	**0015 2B1 1 -20**
		Part number	**8291799**	**8291802**	**8299242**
INPUT					
Supply voltage		[V_{mains}]	200 – 240 V ± 10 %, 1-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	10	16	25
Nominal input current		[A]	6.7	12.5	19.3
OUTPUT					
Recommended motor power		[kW]	0.37	0.75	1.5
		[PS]	0.5	1	2
Output voltage		[V]	3 × 20 – 250 V		
Output current		[A]	2.3	4.3	7
Motor cable size Cu 75C		[mm^2]	1.5		
		[AWG]	16		
Max. motor cable length	Shielded	[m]	25		
	Unshielded		40		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	11	22	45
Minimum braking resistor value		[Ω]	–	–	–

10.3.2 1-phase system AC 230 V for 3-phase AC 230 V motors (size 2)

Standard MOVITRAC®		**MC LTP A...**	**0015 2B1 4 -00**	**0022 2B1 4 -00**
		Part number	**8286949**	**8286957**
IP55/NEMA 12 housing MOVITRAC®		**MC LTP A...**	**0015 2B1 4 -10**	**0022 2B1 4 -10**
		Part number	**8291772**	**8291780**
IP55/NEMA 12 with switch MOVITRAC®		**MC LTP A...**	**0015 2B1 4 -20**	**0022 2B1 4 -20**
		Part number	**8294925**	**8294933**
INPUT				
Supply voltage		[V_{mains}]	200 – 240 V ± 10 %, 1-phase	
Supply frequency		[f_{mains}]	50/60 Hz	
Supply fuse rating		[A]	25	32
Nominal input current		[A]	19.3	28.8
OUTPUT				
Recommended motor power		[kW]	1.5	2.2
		[PS]	2	3
Output voltage		[V]	3 × 20 – 250 V	
Output current		[A]	7	10.5
Motor cable size Cu 75C		[mm^2]	1.5	
		[AWG]	16	
Max. motor cable length	Shielded	[m]	100	
	Unshielded		150	
GENERAL INFORMATION				
Heat loss at nominal output power		[W]	45	66
Minimum braking resistor value		[Ω]	33	22

10.3.3 3-phase system AC 230 V for 3-phase AC 230 V motors (size 3)

MOVITRAC®		**MC LTP A...**	**0030 2A3 4 -00**	**0040 2A3 4 -00**	**0055 2A3 4 -00**
		Part number	**8286965**	**8286973**	**8286981**
INPUT					
Supply voltage		[V_{mains}]	200 – 240 V ± 10%, 3-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	20		32
Nominal input current		[A]	16.1	17.3	25
OUTPUT					
Recommended motor power		[kW]	3	4	5.5
		[PS]	4	5	7.5
Output voltage		[V]	3 × 20 – 250 V		
Output current		[A]	14	18	24
Motor cable size Cu 75C		[mm^2]	2.5		4
		[AWG]	14		12
Max. motor cable length	Shielded	[m]	100		
	Unshielded		150		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	90	120	165
Minimum braking resistor value		[Ω]	15		

10.3.4 3-phase system AC 230 V for 3-phase AC 230 V motors (size 4)

MOVITRAC®		MC LTP A... Part number	0075 2A3 4 -00 8287007	0110 2A3 4 -00 8287015	0150 2A3 4 -00 8287023	0185 2A3 4 -00 8287031
INPUT						
Supply voltage		[V_{mains}]	200 – 240 V ± 10%, 3-phase			
Supply frequency		[f_{mains}]	50/60 Hz			
Supply fuse rating		[A]	50	63	80	
Nominal input current		[A]	46.6	54.1	69.6	76.9
OUTPUT						
Recommended motor power		[kW]	7.5	11	15	18.5
		[PS]	10	15	20	25
Output voltage		[V]	3 × 20 – 250 V			
Output current		[A]	39	46	61	72
Motor cable size Cu 75C		[mm^2]	10		16	
		[AWG]	8		6	
Max. motor cable length	Shielded	[m]	100			
	Unshielded		150			
GENERAL INFORMATION						
Heat loss at nominal output power		[W]	225	330	450	555
Minimum braking resistor value		[Ω]	6			

10.3.5 3-phase system AC 230 V for 3-phase AC 230 V motors (size 5)

MOVITRAC®		MC LTP A... Part number	0220 2A3 4 -00 8287058	0300 2A3 4 -00 8287066	0370 2A3 4 -00 8287074	0450 2A3 4 -00 8287082
INPUT						
Supply voltage		[V_{mains}]	200 – 240 V ± 10%, 3-phase			
Supply frequency		[f_{mains}]	50/60 Hz			
Supply fuse rating		[A]	100	125	160	200
Nominal input current		[A]	92.3	116.9	150.2	176.5
OUTPUT						
Recommended motor power		[kW]	22	30	37	45
		[PS]	30	40	50	60
Output voltage		[V]	3 × 20 – 250 V			
Output current		[A]	90	110	150	180
Motor cable size Cu 75C		[mm^2]	25	35	55	70
		[AWG]	4	2	2 / 0	2 / 0
Max. motor cable length	Shielded	[m]	100			
	Unshielded		150			
GENERAL INFORMATION						
Heat loss at nominal output power		[W]	660	900	1110	1350
Minimum braking resistor value		[Ω]	3			

10.3.6 3-phase system AC 230 V for 3-phase AC 230 V motors (size 6)

MOVITRAC® MC LTP A...		MC LTP A... Part number	0550 2A3 4 -00 8287090	0750 2A3 4 -00 8287104	0900 2A3 4 -00 8287112
INPUT					
Supply voltage		[V_{mains}]	200 – 240 V ± 10 %, 3-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	250	315	
Nominal input current		[A]	217.2	255.7	302.4
OUTPUT					
Recommended motor power		[kW]	55	75	90
		[PS]	75	100	120
Output voltage		[V]	3 × 20 – 250 V		
Output current		[A]	202	240	300
Motor cable size Cu 75C		[mm^2]	90	120	170
		[AWG]	3 / 0	4 / 0	
Max. motor cable length	Shielded	[m]	100		
	Unshielded		150		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	1650	2250	2700
Minimum braking resistor value		[Ω]	3		

10.3.7 3-phase system AC 400 V for 3-phase AC 400 V motors (size 2)

Standard MOVITRAC® IP55/NEMA 12 housing MOVITRAC® IP55/NEMA 12 with switch MOVITRAC®		MC LTP A... Part number MC LTP A... Part number MC LTP A... Part number	0008 5A3 4 -00 8287147 0008 5A3 4 -10 8292582 0008 5A3 4 -20 8292620	0015 5A3 4 -00 8287155 0015 5A3 4 -10 8292590 0015 5A3 4 -20 8292639	0022 5A3 4 -00 8287163 0022 5A3 4 -10 8292604 0022 5A3 4 -20 8292647	0040 5A3 4 -00 8287171 0040 5A3 4 -10 8292612 0040 5A3 4 -20 8292655
INPUT						
Supply voltage		[V_{mains}]	380 – 480 V ± 10%, 3-phase			
Supply frequency		[f_{mains}]	50/60 Hz			
Supply fuse rating		[A]	6		10	16
Nominal input current		[A]	2.9	5.4	7.6	12.4
OUTPUT						
Recommended motor power		[kW]	0.75	1.5	2.2	4
		[PS]	1	2	3	5
Output voltage		[V]	3 × 20 – 480 V			
Output current		[A]	2.2	4.1	5.8	9.5
Motor cable size Cu 75C		[mm^2]	1.0		1.5	
		[AWG]	18		16	
Max. motor cable length	Shielded	[m]	50	100		
	Unshielded		75	150		
GENERAL INFORMATION						
Heat loss at nominal output power		[W]	22	45	66	120
Minimum braking resistor value		[Ω]	47			33

10.3.8 3-phase system AC 400 V for 3-phase AC 400 V motors (size 3)

MOVITRAC®		MC LTP A... Part number	0055 5A3 4 -00 8287198	0075 5A3 4 -00 8287201	0110 5A3 4 -00 8287228	0150 5A3 4 -00 8287236
INPUT						
Supply voltage		[V_{mains}]	380 – 480 V ± 10%, 3-phase			
Supply frequency		[f_{mains}]	50/60 Hz			
Supply fuse rating		[A]	20		32	40
Nominal input current		[A]	16.1	17.3	25	32.9
OUTPUT						
Recommended motor power		[kW]	5.5	7.5	11	15
		[PS]	7.5	10	15	20
Output voltage		[V]	3 × 20 – 480 V			
Output current		[A]	14	18	24	30
Motor cable size Cu 75C		[mm^2]	2.5		4.0	6.0
		[AWG]	14		12	10
Max. motor cable length	Shielded	[m]	100			
	Unshielded		150			
GENERAL INFORMATION						
Heat loss at nominal output power		[W]	165	225	330	450
Minimum braking resistor value		[Ω]	22			

10.3.9 3-phase system AC 400 V for 3-phase AC 400 V motors (size 4)

MOVITRAC®		MC LTP A... Part number	0185 5A3 4 - 00 8287244	0220 5A3 4 -00 8287252	0300 5A3 4 -00 8287260	0370 5A3 4 -00 8287279
INPUT						
Supply voltage		[V_{mains}]	380 – 480 V ± 10%, 3-phase			
Supply frequency		[f_{mains}]	50/60 Hz			
Supply fuse rating		[A]	50	63	80	
Nominal input current		[A]	46.6	54.1	69.6	76.9
OUTPUT						
Recommended motor power		[kW]	18.5	22	30	37
		[PS]	25	30	40	50
Output voltage		[V]	3 × 20 – 480 V			
Output current		[A]	39	46	61	72
Motor cable size Cu 75C		[mm^2]	10		16	
		[AWG]	8		6	
Max. motor cable length	Shielded	[m]	100			
	Unshielded		150			
GENERAL INFORMATION						
Heat loss at nominal output power		[W]	555	660	900	1110
Minimum braking resistor value		[Ω]	12			

10.3.10 3-phase system AC 400 V for 3-phase AC 400 V motors (size 5)

MOVITRAC®		MC LTP A... Part number	0450 5A3 4 -00 8287287	0550 5A3 4 -00 8287295	0750 5A4 4 -00 8287309	0900 5A3 4 -00 8287317
INPUT						
Supply voltage		[V_{mains}]	380 – 480 V ± 10%, 3-phase			
Supply frequency		[f_{mains}]	50/60 Hz			
Supply fuse rating		[A]	100	125	160	200
Nominal input current		[A]	92.3	116.9	150.2	176.5
OUTPUT						
Recommended motor power		[kW]	45	55	75	90
		[PS]	60	75	100	120
Output voltage		[V]	3 × 20 – 480 V			
Output current		[A]	90	110	150	180
Motor cable size Cu 75C		[mm^2]	25	55		70
		[AWG]	4	2 / 0		2 / 0
Max. motor cable length	Shielded	[m]	100			
	Unshielded		150			
GENERAL INFORMATION						
Heat loss at nominal output power		[W]	1350	1650	2250	2700
Minimum braking resistor value		[Ω]	6			

10.3.11 3-phase system AC 400 V for 3-phase AC 400 V motors (size 6)

MOVITRAC®		MC LTP A... Part number	1100 5A3 4 -00 8287325	1320 5A3 4 -00 8287333	1600 5A3 4 -00 8287341
INPUT					
Supply voltage		[V_{mains}]	380 – 480 V ± 10%, 3-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	250	315	
Nominal input current		[A]	217.2	255.7	302.4
OUTPUT					
Recommended motor power		[kW]	110	132	160
		[PS]	150	175	200
Output voltage		[V]	3 × 20 – 480 V		
Output current		[A]	202	240	300
Motor cable size Cu 75C		[mm^2]	90	120	170
		[AWG]	3 / 0	4 / 0	
Max. motor cable length	Shielded	[m]	100		
	Unshielded		150		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	3300	3960	4800
Minimum braking resistor value		[Ω]	6		

10.3.12 3-phase system AC 575 V for 3-phase AC 575 V motors (size 2)

Standard MOVITRAC®	MC LTP A...	0008 603 4 -00	0015 603 4 -00	0022 603 4 -00	0037 603 4 -00	0055 603 4 -00
	Part number	8286833	8286841	8286868	8286876	8286884
IP55/NEMA 12 housing MOVITRAC®	MC LTP A...	0008 603 4 -10	0015 603 4 -10	0022 603 4 -10	0037 603 4 -10	0055 603 4 -10
	Part number	8290814	8290822	8290830	8290849	8290857
IP55/NEMA 12 with switch MOVITRAC®	MC LTP A...	0008 603 4 -20	0015 603 4 -20	0022 603 4 -20	0037 603 4 -20	0055 603 4 -20
	Part number	8290865	8290873	8290881	8290903	8290911
INPUT						
Supply voltage	[V_{mains}]	500 – 600 V ± 10%, 3-phase				
Supply frequency	[f_{mains}]	50/60 Hz				
Supply fuse rating	[A]	6			10	16
Nominal input current	[A]	2.2	4.1	5.4	7.6	11.7
OUTPUT						
Recommended motor power	[kW]	0.75	1.5	2.2	3.7	5.5
	[PS]	1	2	3	5	7.5
Output voltage	[V]	3 × 20 – 575 V				
Output current	[A]	1.7	3.1	4.1	6.1	9
Motor cable size Cu 75C	[mm^2]	1.0			1.5	
	[AWG]	18			16	
Max. motor cable length Shielded	[m]	100				
Max. motor cable length Unshielded	[m]	150				
GENERAL INFORMATION						
Heat loss at nominal output power	[W]	22	45	66	111	165
Minimum braking resistor value	[Ω]	47				

10.3.13 3-phase system AC 575 V for 3-phase AC 575 V motors (size 3)

MOVITRAC®	MC LTP A...	0075 603 4 -00	0110 603 4 -00	0150 603 4 -00
	Part number	8286892	8286906	8298130
INPUT				
Supply voltage	[V_{mains}]	500 – 600 V ± 10%, 3-phase		
Supply frequency	[f_{mains}]	50/60 Hz		
Supply fuse rating	[A]	20		32
Nominal input current	[A]	16.1	17.3	24.1
OUTPUT				
Recommended motor power	[kW]	7.5	11	15
	[PS]	10	15	20
Output voltage	[V]	3 × 20 – 575 V		
Output current	[A]	14	18	24
Motor cable size Cu 75C	[mm^2]	2.5		4
	[AWG]	14		12
Max. motor cable length Shielded	[m]	100		
Max. motor cable length Unshielded	[m]	150		
GENERAL INFORMATION				
Heat loss at nominal output power	[W]	185	330	450
Minimum braking resistor value	[Ω]	22		

10.3.14 3-phase system AC 575 V for 3-phase AC 575 V motors (size 4)

MOVITRAC®		MC LTP A... Part number	0220 603 4 -00 8298149	0300 603 4 -00 8298157	0450 603 4 -00 8298165
INPUT					
Supply voltage		[V_{mains}]	500 – 600 V ± 10%, 3-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	63		80
Nominal input current		[A]	46.6	54.1	69.6
OUTPUT					
Recommended motor power		[kW]	22	30	45
		[PS]	30	40	60
Output voltage		[V]	3 × 20 – 575 V		
Output current		[A]	39	46	62
Motor cable size Cu 75C		[mm^2]	10		16
		[AWG]	8		6
Max. motor cable length	Shielded	[m]	100		
	Unshielded		150		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	660	900	1350
Minimum braking resistor value		[Ω]	12		

10.3.15 3-phase system AC 525 V for 3-phase AC 500 V motors (size 5)

MOVITRAC®		MC LTP A... Part number	0550 603 4 -50 8299315	0750 603 4 -50 8299323	0900 603 4 -50 8299331
INPUT					
Supply voltage		[V_{mains}]	480 – 525 V ± 10%, 3-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	100	125	160
Nominal input current		[A]	92.3	116.9	150.2
OUTPUT					
Recommended motor power		[kW]	55	75	90
		[PS]	75	100	120
Output voltage		[V]	3 × 20 – 525 V		
Output current		[A]	90	110	150
Motor cable size Cu 75C		[mm^2]	35	50	70
		[AWG]	2	2 / 0	
Max. motor cable length	Shielded	[m]	100		
	Unshielded		150		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	1650	2250	2770
Minimum braking resistor value		[Ω]	6		

10.3.16 3-phase system AC 525 V for 3-phase AC 500 V motors (size 6)

MOVITRAC®		MC LTP A... Part number	1320 603 4 -50 8299358	1600 603 4 -50 8299366	2000 603 4 -50 8299374
INPUT					
Supply voltage		[V_{mains}]	480 – 525 V ± 10%, 3-phase		
Supply frequency		[f_{mains}]	50/60 Hz		
Supply fuse rating		[A]	250	315	
Nominal input current		[A]	217.2	255.7	290
OUTPUT					
Recommended motor power		[kW]	132	160	200
		[PS]	175	210	250
Output voltage		[V]	3 × 20 – 525 V		
Output current		[A]	202	240	270
Motor cable size Cu 75C		[mm^2]	90	120	170
		[AWG]	3 / 0	4 / 0	
Max. motor cable length	Shielded	[m]	100		
	Unshielded		150		
GENERAL INFORMATION					
Heat loss at nominal output power		[W]	3960	4800	6000
Minimum braking resistor value		[Ω]	6		

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Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
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Service Competence Center	**Industrial Gears**	**SEW Caron-Vector** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
	Antwerp	**SEW Caron-Vector** Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be

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	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew- eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew- eurodrive.ca
	Additional addresses for service in Canada provided on request!		

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	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 88241718 Fax +86 29 68686296 logistic-xa@sew-eurodrive.cn
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Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Service	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah **United Arabian Emirates**	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	SEW-EURODRIVE LLP Raimbek Ave. 348 KZ-050061 Almaty	Tel.+7 (727) 334 1880 Fax +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 ssacar@inco.com.lb
	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 philipppe.acar@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 522618372 Fax +212 522618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
		VECTOR Aandrijftechniek B.V. Gelderhorst 10 NL-7207 BH Zutphen Industrieterrein de Revelhorst	Tel. +31 575 57 44 94 Fax +31 575 57 24 43 oost@vector.nu
		VECTOR Aandrijftechniek B.V. Mercuriusweg 8A NL-5971 LX Grubbenvorst	Tel. +31 77 36 61 873 Fax +31 77 36 62 109 zuid@vector.nu
		VECTOR Aandrijftechniek B.V. Weberstraat 74 NL-1446 VV Purmerend Industrieterrein "De Baanstee"	Tel. +31 299 66 63 38 Fax +31 299 47 60 55 noordwest@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za

South Africa			
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service** **Corporate Offices**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net




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