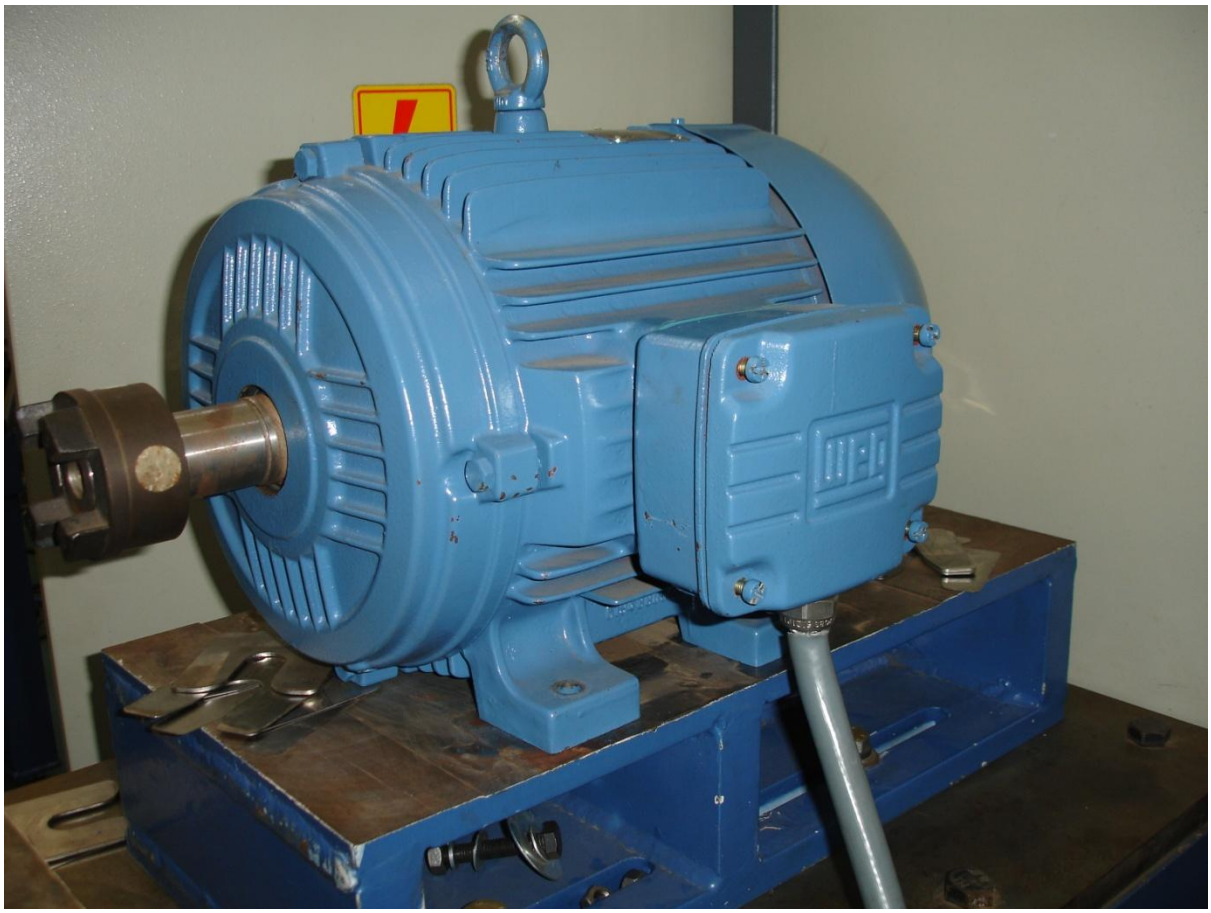
Short description only - for complete manuals see
Instrumentation manuals

Test table

Length:	2.6m (Maximum shaft length of **1.5m** between the Electric motor and alternator)
Width:	0.5m
Height:	1.06m
Centre height:	130mm (min)
Mounting slots:	none

Electric motor



Power: 5.5 kW – three phase, four pole
Speed: variable frequency speed control up to 1765 rpm
Volts: 380V
Amps: 10.9

Alternator (5.5 Kva)

Load control

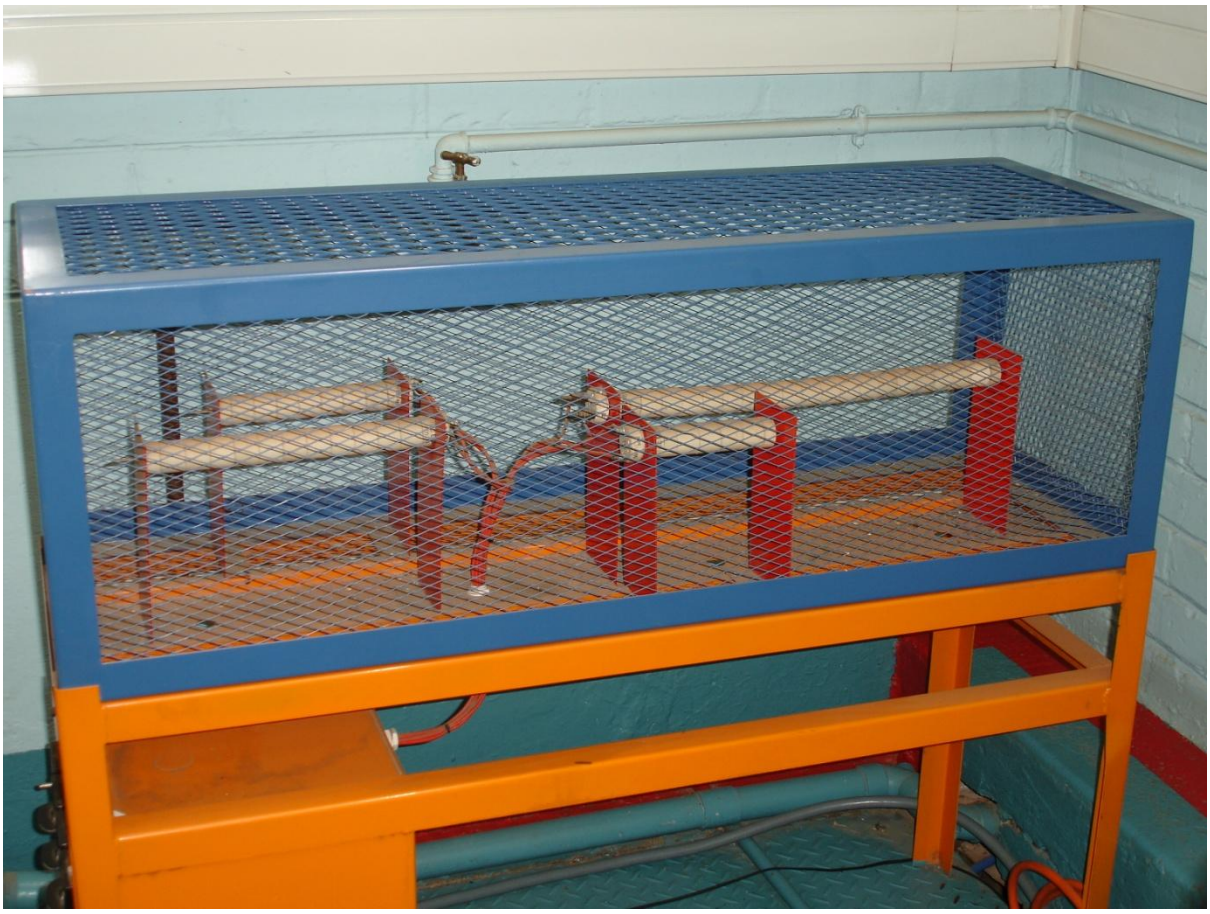
An analogue controller manipulate the electromagnetic field strength in the alternator to allow load change.

The alternating current generated is rectified and dissipated over a resistive load. A single phase voltage feedback is measured to give an indication of current. The current drawn from the alternator is related to the torque applied to the system.
A torque signal is then used as an input to the controller which manipulates the electromagnetic field strength in the alternator

by switching the current flow to the DC field coils of the alternator with a transistor in order to follow the command signal.
A virtual function generator is used to generate the load command signals for the controlling system.

Analogue controller

Resistive load



250W, 500W, 1Kw and 2kW

0117236001

WEG INDÚSTRIAS S/A

Nr.:

Date: 1 - Nov, 2001

DATA SHEET
Three-phase Induction Motor - Squirrel Cage

Customer	: RESEARCH @ PRETORIA UNIVERSITY
Motor line	: MULTIVOLTAGE

Frame	: 132S
Rated Output	: 5.50 kW
Frequency	: 50 Hz
Poles	: 2 Poles 4 Pole used
Full load speed	: 2930 rpm ≈ 1500 rpm
Slip	: 2.33 %
Voltage	: 380/660 V
Full load current	: 10.7
Locked rotor amps	: 85.6
Locked rotor current (Il/In)	: 8.00
No load current	: 3.60
Full load torque	: 18.0 Nm
Locked rotor torque	: 250 %
Breakdown torque	: 290 %
Design	: N
Insulation class	: F
Temperature rise	: 80 K
Locked rotor time	: 17 s
Service factor	: 1.00
Duty cycle	: S1
Ambient temperature	: 40 °C
Altitude	: 1000 m.a.s.l
Degree of protection	: IP55
Aprox. weight	: 62.0 kg
Moment of inertia	: 0.0206 kgm²

	D.E.	N.D.E.
Bearings	6308-ZZ	6207-ZZ
Regreasing int.	---	---
Grease amount	---	---

Load	cos ø	Efficiency(%)
100%	0.88	88.4
75%	0.85	88.7
50%	0.77	84.4

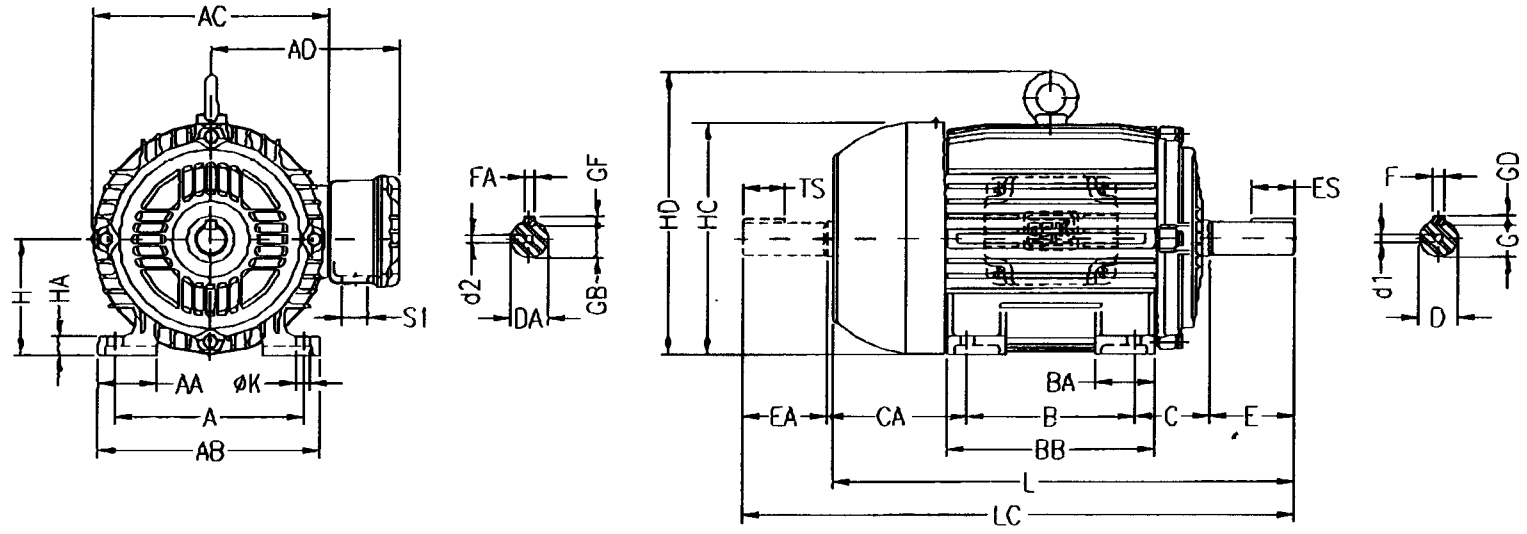
Optional features:

5.5KW2P380VB3

* Note: The values shown are subject to change without prior notice

Performed:	Checked:

Version 3.3



A 216	**AA** 51	**AB** 248	**AC** 270	**AD** 207
B 140	**BA** 55	**BB** 187	**C** 89	**CA** 150
D 38k6	**E** 80	**ES** 63	**F** 10	**G** 33
GD 8	**DA** 28j6	**EA** 60	**TS** 45	**FA** 8
GB 24	**GF** 7	**H** 132	**HA** 20	**HC** 274
HD 319	**K** 12	**L** 452	**LC** 519	**S1** 2xM25x1.5
d1 DM12	**d2** DM10			

Note: 5.5KW2P380VB3

Performed:

Checked:

Customer: RESEARCH @ PRETORIA UNIVERSITY

MULTIVOLTAGE

Three-phase Induction Motor
Frame 132S - IP55

1 - Nov, 2001

0117236001

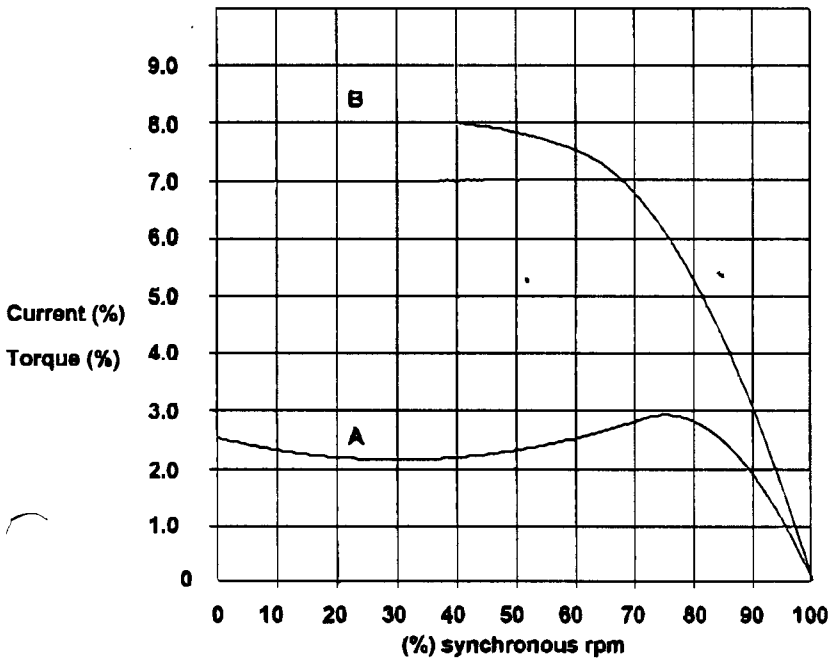
Nr.:

Date: 1 - Nov, 2001

Customer : RESEARCH @ PRETORIA UNIVERSITY

Motor line: MULTIVOLTAGE

TORQUE AND CURRENT CURVES

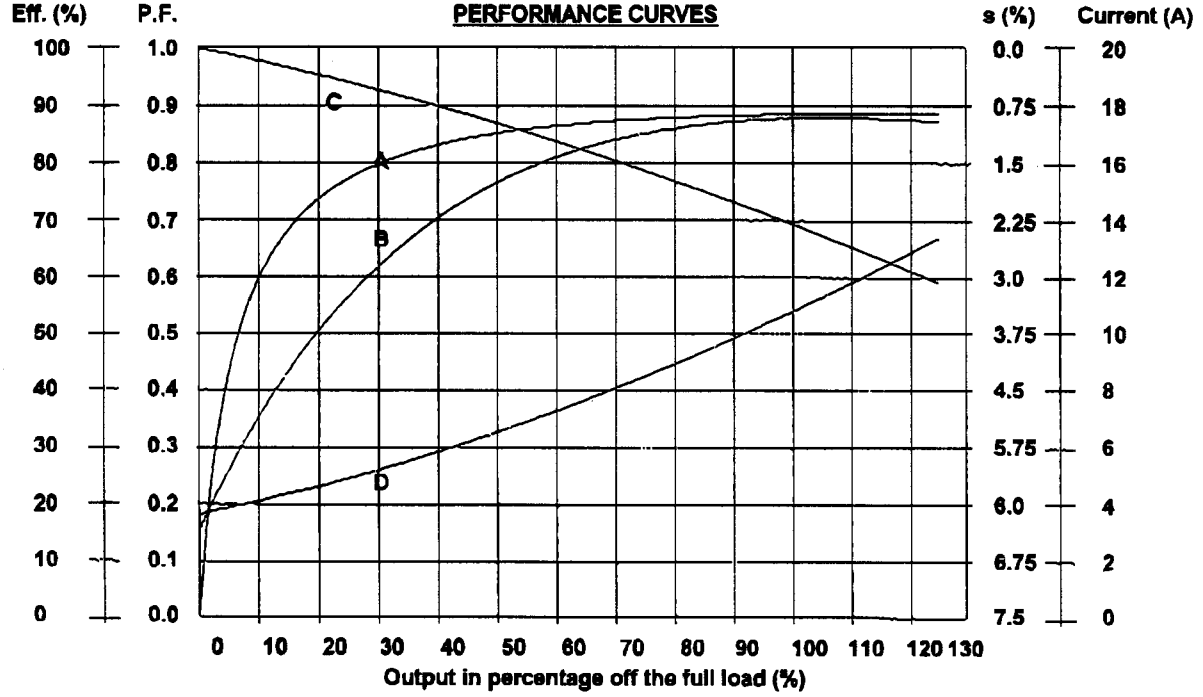


Output:	5.50 kW
Poles:	2 Poles
Frequency:	50 Hz
LRT (%):	2.5
BDT (%):	2.9
Ip (%):	8
Voltage:	380 Volts

B - Current curve

A - Torque curve

PERFORMANCE CURVES



A - Efficiency

B - Power Factor

C - Slip

D - Current

Performed :	Checked :

* Note: The values shown are subject to change without prior notice

INVERTEK DRIVES LTD

OPTIFILTER

User Guide

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation. The contents of this User Guide are believed to be correct at the time of printing. In the interests of a commitment to a policy of continuous improvement, the manufacturer reserves the right to change the specification of the product or its performance or the contents of the User Guide without notice.

SAFETY

This filter is specifically designed to be used with the Optidrive variable speed drive product and is intended for professional incorporation into complete equipment or systems. If installed incorrectly it may present a safety hazard. The Optidrive uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical plant that may cause injury. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction.

System design, installation, commissioning and maintenance must be carried out only by personnel who have the necessary training and experience. They must read carefully this safety information and the instructions in this Guide and follow all information regarding transport, storage, installation and use of the Optifilter, including the specified environmental limitations.

Please read the IMPORTANT SAFETY INFORMATION below, and all Warning and Caution boxes elsewhere.

SAFETY NOTICES

WARNING is given where there is a hazard that could lead to injury or death of personnel.
CAUTION is given where there is a hazard that could lead to damage to equipment.

It is the responsibility of the installer to ensure that the equipment or system into which the product is incorporated complies with the EMC legislation of the country of use. Within the European Union, equipment into which this product is incorporated must comply with 89/336/EEC, Electromagnetic Compatibility.

WARNING
Within the European Union, all machinery in which this product is used must comply with the Directive 89/392/EEC, Safety of Machinery. In particular, the equipment should comply with EN60204-1.

WARRANTY

All Invertek Drives Ltd (IDL) products carry a 2-year warranty, valid from the date of manufacture. This date is clearly visible on the rating label.

Complete Warranty Terms and Conditions are available upon request from your IDL Authorised Distributor.

Invertek Drives Ltd
Four Crosses
Llanymynech
Powys
SY22 6LP
UK

Tel: +44 (0) 1691 831133
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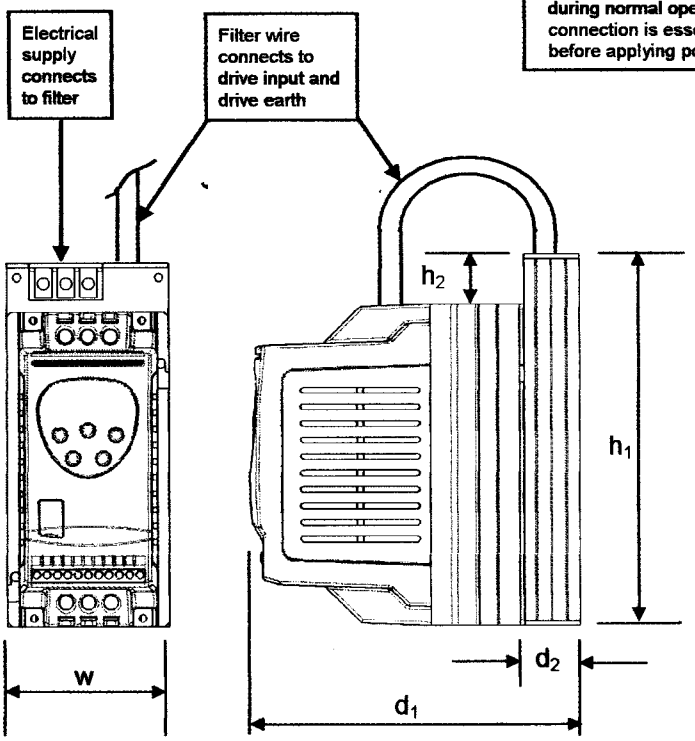
email: enquiry@invertek.co.uk
Internet: www.invertek.co.uk

Part No. 82-OFMAN-UK
Rev 01, ECN0008 March 1999

MECHANICAL AND ELECTRICAL INSTALLATION

CAUTION
- Carefully inspect the Optifilter before installation to ensure it is undamaged.
- Store the Optifilter in its box until wanted. Storage should be clean and dry. Temperature range –40°C to +60°C.
- Install the Optifilter on a flat, vertical, flame-resistant vibration-free mounting within an IP54 or equivalent enclosure (EN60529).
- Flammable material should not be placed close to the filter.
- Wherever control cabling is close to power cabling, maintain a minimum separation of 100 mm and arrange crossings at 90°

WARNING
- Optifilters should be installed only by qualified electrical persons and in accordance with local and national regulations and codes of practice.
- *Electric shock hazard!* Disconnect and ISOLATE the Optidrive before attempting any work on it. High voltages are present at the terminals and within the drive for up to 10 minutes after disconnection of the electrical supply.
- 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.
- These filters contain capacitors that are connected between phase and earth; a leakage current will flow during normal operation, therefore a good earth connection is essential and must be connected before applying power to the filter.



CONFORMITY with STANDARDS
- CE-marked for Low Voltage Directive.
- IEC 664-1 Insulation Coordination within Low Voltage Systems.
- UL 840 Insulation coordination for electrical equipment.
- EN50081-2 EMC Generic Emissions Standard, Industrial Level.
- EN50082-2 EMC Generic Immunity Standard, Industrial Level.
- Enclosure ingress protection, EN60529 IP20, NEMA 250.
- Flammability rating according to UL 94.

G O Jones, Technical Director

EASY START UP
- Optifilter is designed to slide on to the back of the Optidrive heatsink creating a simple integrated assembly.
- Fixing holes for the combined assembly are the same as for the standalone drive; longer screws are provided.
- The electrical supply connects to the filter; connection of the supply earth to the filter earth is essential.
- The filter wire (see diagram above) connects to the drive input and drive earth points as per the label on the wire.
- ✣ When screened motor cable is used and connected as per the Optidrive manual employing good wiring practice, the integrated Optifilter and Optidrive assembly meets the European standard for EMC for motor - drive cable lengths defined in the table below.

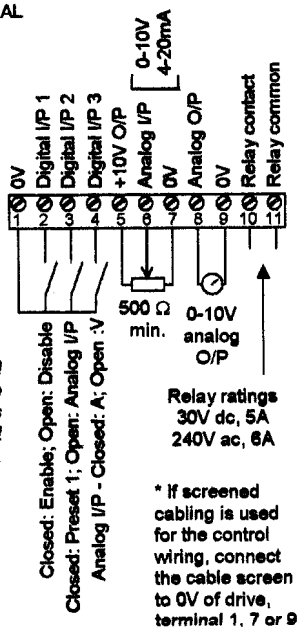
Size			*1*	*2*	*2*	*3*
Optifilter model reference	OD-xxxxx-IN		F1121	F2121	F2341	F3341
Supply voltage	+/-10%		220-240	220-240	220-480	220-480
Phases			1	1	3	3
Output current (max)		A	10	30	30	30
Earth leakage current		mA	<1.6	<1.6	<30	<30
Dimensions	w	mm	80	100	100	171
	h_1	mm	180	295	295	295
	h_2	mm	25	35	35	35
	d_1	mm	157	220	220	220
	d_2	mm	27	45	45	45
Weight (filter only)		kg	0.6	1.2	1.2	1.5
Weight (filter + drive)		kg	1.6	3.7	3.7	6.5
Compliance to Conducted Emissions standards ✣						
EN 50081-1 (Domestic): motor-drive cable length						
Drive F_{SW} (P-17) = 4kHz		m	10	5	5	5
Drive F_{SW} (P-17) = 8kHz		m	5	5	5	5
Drive F_{SW} (P-17) = 16kHz		m	5	5	5	5
EN 50081-2 (Industrial): motor-drive cable length						
Drive F_{SW} (P-17) = 4kHz		m	40	35	35	30
Drive F_{SW} (P-17) = 8kHz		m	30	30	30	30
Drive F_{SW} (P-17) = 16kHz		m	25	25	25	25
Compliance to Radiated Emissions standards ✣			All Optidrives comply to EN 50081-1with or without filter			
For use with following Optidrives	OD-xxxxx-IN		12037 12055 12075	22110 22150 22220	24075 24110 24150 24220 24300 24400	34055 34075 34110 34150

WARNING

- The STOP function does not remove potentially lethal high voltages. ISOLATE the drive and wait 10 minutes before starting any work on it.
- Parameter P-01 can be set to operate the motor at up to 30,000 rpm. Take care with the setting of this parameter.
- If it is desired to operate the drive at any frequency/speed above the rated speed (P-09/ P-10) of the motor, consult the manufacturers of the motor and the driven machine about suitability for overspeed operation.
- The fan fitted to the bottom of the Optidrive starts automatically when the heatsink temperature reaches approximately 40°C. At room temperature, the fan will be stopped.

CONTROL TERMINAL BLOCK

Default status



Refer to the Digital Inputs table overleaf for details of the digital input functions 1 to 3.

Relay ratings
30V dc, 5A
240V ac, 6A

* If screened cabling is used for the control wiring, connect the cable screen to 0V of drive, terminal 1, 7 or 9

EASY START-UP

When delivered, the Optidrive is in the default state, meaning that it is set to operate in Terminal mode and all parameters (P-xx) have the default values as shown overleaf.

- Connect a control switch between terminals 1 and 2.
- Connect a potentiometer (500 ohm min.) between terminals 5 and 7, and wiper to terminal 6.
- Set the control switch between pins 1 and 2 open so that the drive is 'disabled'.
- With the potentiometer set to zero, switch on the supply to the drive. The display will show StoP.
- Close the control switch, terminals 1-2. The drive is now 'enabled' and the output frequency/speed are controlled by the potentiometer. The display shows zero speed in Hz (H 0.0) with the potentiometer turned to minimum.
- Turn the potentiometer to maximum. The motor will accelerate to 50Hz (the default value of P-01) under the control of the accelerating ramp time P-03 (5s). The display shows H 50.0 (50Hz) at max speed.
- To display motor current (A), briefly press the Navigate key ⇔.
- Press ⇔ again to return to speed display.
- To stop the motor, either turn the potentiometer back to zero or disable the drive by opening the control switch (terminals 1-2).
- If the enable/disable switch is opened, or the potentiometer is turned to zero, the display shows speed decreasing to zero under the control of the decelerating ramp time P-04. When zero is reached, the drive then displays StoP at which point the drive is disabled.

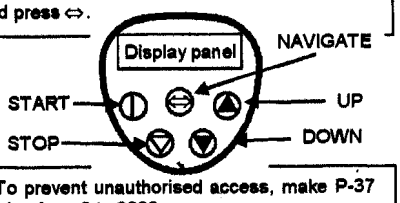
KEYPAD (PUSHBUTTON) CONTROL

- Connect a control switch between terminals 1 and 2.
- Press and hold the Navigate key ⇔ to access Parameter Edit mode. Change P-12 to 1 or 2.
- Close the control switch (terminals 1 & 2) and push the START button on the drive. Increase / decrease speed using the UP / DOWN keys. Push the STOP button to stop the drive.
- For remote push button operation, see Application Note AN21 available on request.

MANAGING THE KEYPAD

When the drive is delivered from the factory, only the Standard Parameter Set (see overleaf) is accessible. To access the Standard Parameter Set, press the Navigate key ⇔ for >1 sec.

- Scroll through P-01 to P-14 (and roll over to P-01) by pressing ▲ or ▼.
- To display the parameter value, press ⇔.
- To edit the parameter value, press ▲ or ▼.
- To return to the parameter number, press ⇔.
- To exit from edit mode, press ⇔ for >1 sec or press no button for >20 sec.
- To access the Extended Parameter Set, set P-14 = 101 and press ⇔.



NOTE To prevent unauthorised access, make P-37 = any value from 0 to 9999.

- When in the Extended Parameter Set (except P-00), the display will revert to normal if no button is pressed for >20 sec.
- When P-00 is accessed, the display will revert to normal if no button is pressed for >60 sec.

TO SAVE CHANGES to Parameter settings, switch the power supply off and wait for the drive to power down (screen blank) before switching on. NOTE that this assumes P-38 = 0 (default). If P-38 = 1, changes are not saved.

TO RESTORE ALL DEFAULT VALUES, stop the drive and when display shows StoP, press and hold the ▲, ▼ and STOP keys simultaneously. The display will show P-dEF. Access code P-37 will revert to 101 but the hours-run meter P-39 is not affected. Press STOP to resume normal operation.

SIMPLE PARAMETER ADJUSTMENTS

The factory-set defaults may give satisfactory performance, however certain adjustments may be beneficial.

Maximum and Minimum Speeds P-01 & P-02
Set P-01 to the maximum speed and P-02 to the minimum speed for your application. These limits are mirrored for negative speeds.

Acceleration and Deceleration P-03 & P04
Ramps which are too short will cause the drive to deliver currents in excess of full load current and may result in it tripping out or stalling the motor.

Stop Mode P-05
When ramp to stop (P-05 = 0) is selected, the drive decelerates the motor at the rate set by decel ramp time P-04.
If a non-zero minimum speed is set in P-02, the motor will ramp (P-03) to this minimum speed as soon as the drive is enabled. When disabled, the motor will ramp to zero then disable (P-05 = 0).
If it is preferred that the motor and load should decelerate naturally, *ie* freewheel, set P-05 = 1.

Torque/Speed Characteristic P-06
Certain loads such as fans and centrifugal pumps need very little torque at low speed. Set P-06=1 to reduce power loss at low speeds for this load type.

Rated Current, Rated Frequency and Rated Speed
P-08, P-09, P-10. Parameters P-08 and P-09 should to be set to correspond with the rated current and frequency shown on the motor rating plate.
Parameter P-10 is optional. If this parameter is set to zero (default state), speed will be displayed in Hz; if speed indication is required in rpm, enter the motor rated speed (speed at full load) from the motor rating plate. This also activates the slip compensation feature which improves speed regulation/ holding for different load conditions.

Voltage Boost P-11
Any load which is 'sticky' to start will benefit from a voltage boost on starting. P-11 permits a boost of up to 25% of full motor voltage to be applied.
NOTE: Use of this parameter increases motor heating at low speeds.

Terminal or Keypad Control P-12
Terminal control is used when the drive needs to be controlled from some remote point, as for example by the action or status of a machine or system.
Keypad control is used when local manual control is preferable, and for commissioning.

Extended Parameter Set P15 to P-40 and P-00
The Extended Parameter Set is intended for use by specialist drives engineers and technicians and will not generally be required for simple applications.

OPERATING IN KEYPAD MODE

With P-12 set to 1:

- Enable the drive. The display will show StoP.
- Press the START key. The display shows H 0.0.
- Press ▲ to increase speed.
- The drive will run forward, increasing speed until ▲ is released. The rate of acceleration is limited by the setting in P-03.

Either Press ▼ to decrease speed.

- The drive will decrease speed until ▼ is released. The rate of deceleration is limited by the setting in P-04.

Or Press the STOP key.

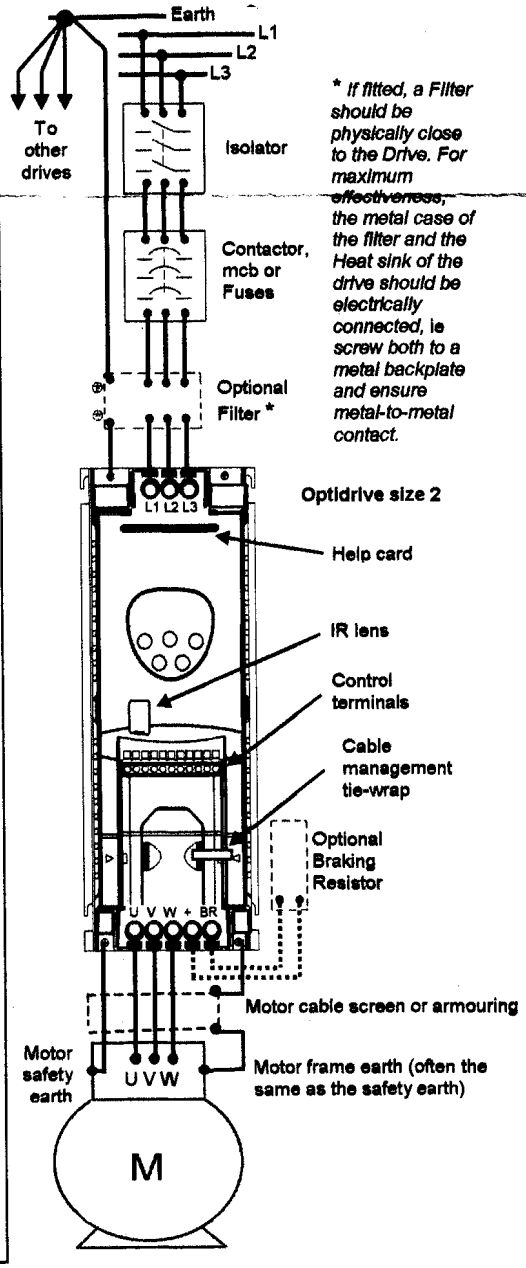
- The drive will decelerate to rest at the rate set in P-04.
- The display will finally show StoP at which point the drive is disabled.

With P-12 set to 2:

- Press the START key. The display changes to H 0.0.
- Press ▲ to increase speed.
- The drive will run forward, increasing speed until ▲ is released. Acceleration is limited by the setting in P-03. The maximum speed is the speed set in P-01.
- Press the START key again. The motor will reverse its direction of rotation.

POWER CONNECTIONS AND GROUNDING

Each drive star connected to system earth point



** If fitted, a Filter should be physically close to the Drive. For maximum effectiveness, the metal case of the filter and the Heat sink of the drive should be electrically connected, ie screw both to a metal backplate and ensure metal-to-metal contact.*

KEY TO SYMBOLS IN THE DISPLAY

H 50.0 = 50 Hz output speed A 4.5 = 4.5 amps rms output current 1465 = 1465rpm output speed StoP = drive disabled
P 01 = Parameter P-01 L = Parameter locked (P-38) E = Error. Parameter can only be changed in STOP mode
Flashing decimal points = drive is in overload StndbY = drive enabled, but output temporarily disabled to save energy (P-29)

STANDARD PARAMETER SET

If a non zero value is loaded into P-10, parameters P-01, P-02, P-20 ... P-23, P-27 and P-28 are in rpm.

Par.	*Description*	*Range*	*Default*	*Explanations*	*Set to*
P-01	Maximum speed	P-02 to 5*P-09 (max 545Hz)	50Hz	Maximum speed limit – Hz or rpm. See P-10.	
P-02	Minimum speed	0 to P-01 (max 545 Hz)	0Hz	Minimum speed limit – Hz or rpm. See P-10.	
P-03	Accel ramp time (s)	0 to 3,000s	5s	Accelerating time from 0 to maximum speed in seconds.	
P-04	Decel ramp time (s)	0 to 3,000s	5s	Decelerating time from maximum speed to 0 in seconds.	
P-05	Stop mode select	0, 2: Ramp stop 1: Coast to stop	0	On loss of supply, 0: Mains loss ride thro' 2: Ramp at P-07 to stop	
P-06	V/F characteristic	0: Constant torque, 1: Pump/fan	0	Either $V = kf$ (linear) or $V = kf^2$ (pumps / fans with HVAC rating).	
P-07	Rapid decel ramp time (s)	0.0 to 25s. (Disabled when 0.0s)	0.0s	Decel ramp time after mains loss (P-05 = 0 or 2) (see also P-19 table)	
P-08	Motor rated current	25% -100% of drive current rating	Drive rating	Rated (nameplate) current of the motor (Amps)	
P-09	Motor rated frequency	25 to 545Hz	50 Hz	Rated (nameplate) frequency of the motor. Changing P-09 resets P-02, P-10 & P-28 to 0, & P-01=P-09.	
P-10	Motor rated speed	0, P-09*12 to P-09*60 eg for 50Hz motor, range is 600 to 3000 rpm	0	When non-zero, speed is displayed in rpm in parameters P-01, P-02, P-20...P-23, P-27 and P-28; also slip compensation is automatically activated whenever this parameter is non-zero. – see also P-24.	
P-11	Voltage boost	0 to 25% of max output voltage	3%	Applies an adjustable boost to the Optidrive voltage output at low speed to assist with starting 'sticky' loads.	
P-12	Terminal or Keypad control	0:, 3: Terminal control 1: Keypad control – fwd only 2: Keypad control – fwd and rev	0 (Terminal control, no IR transmit)	3: Terminal control with Optidrive speed info transmitted via IR link. When P-12 = 2, the keypad START key toggles between forward and reverse, after STOP drive always starts in a forward direction.	
P-13	Trip log	Last four trips stored	Read only	Most recent 4 trips stored in order of occurrence, *ie* on entry, display shows most recent first. Press ▲ or ▼ to step through all four.	
P-14	Extended menu access	Code 0 to 9999	0	Set to "101" (default) for extended menu access. Change code in P-37 to prevent unauthorised access to the Extended Parameter Set.	

EXTENDED PARAMETER SET

Par.	*Description*	*Range*	*Default*	*Explanations*	*Set to*
P-15	Motor rated voltage	230V product: 80V to 250V 400V product: 80V to 500V	0V 400V	When P-15 is non-zero, the applied motor voltage is controlled and scaled so that the specified voltage is achieved at rated freq (P-09).	
P-16	Analog input format (V / mA)	Voltage: 0-10V, 10-0V, -10-10V Current: 4-20mA, 0-20mA, 20-4mA	0-10V	Analog input format (on terminal 6). Set to "–10 -10" for bipolar analog input.	
P-17	Effective Power stage Switching frequency	8, 16, 32 kHz (sizes #1, #2) 8, 16 kHz (sizes #3, #4) (see Optidrive Data tables at right)	16kHz (8kHz 400V Optidrives)	Effective Power stage switching frequency. Improvements in acoustic noise and output current waveform occur with increasing switching frequency at the expense of increased losses within the drive	
P-18	Relay output function	0: Drive enabled 1: Drive healthy 2: Set speed 3: Motor at zero 4: Motor at max speed (P-01)	1 : (Drive healthy)	Relay output function. Contacts closed if selected condition is true. Zero speed is set when the output frequency is < 5% of base frequency.	
P-19	Digital inputs function select	0 to 10	0	Defines function of digital inputs. (See also P-16 and Digital Inputs table at right.)	
P-20	Preset / Jog speed 1	-P-01 (reverse) to P-01	50Hz	Defines Preset / Jog speed 1.	
P-21	Preset / Jog speed 2	-P-01 (reverse) to P-01	0 Hz	Defines Preset / Jog speed 2.	
P-22	Preset / Jog speed 3	-P-01 (reverse) to P-01	0 Hz	Defines Preset / Jog speed 3.	
P-23	Preset / Jog speed 4	-P-01 (reverse) to P-01	0 Hz	Defines Preset / Jog speed 4.	
P-24	Slip compensation	20% to 250%	100%	Slip correction factor. Value defines the %age of the internally calculated slip compensation value to be applied. See also P-10.	
P-25	Analog output function	(A) 0:Motor Speed 1:Motor current (D) 2:Drive enabled 3: Set speed	0	Analog output select. (When P-25 = 0, 10V = 100% of P-01 otherwise 10V = 200% of P-08). P-25 = 2 or 3 gives a 5V digital output	
P-26	V/F characteristic adjustment factor	20% to 250%	100%	Used with P-29 to adjust the V/F characteristic. When P-26 > 100%, motor voltage is increased, when P-26 < 100%, voltage is reduced.	
P-27	Skip freq / speed	0 to P-01 (max)	0 Hz	Centre point for skip frequency band. The skip frequency band defined by P-27, P-28 is mirrored around zero for negative speeds.	
P-28	Skip freq / speed band	0 to100% of rated speed/freq. P-09	0 Hz	Width of skip frequency band, the centre of which is defined by P-27.	
P-29	V/F characteristic adjustment frequency	0 to base frequency (P-09) (Function disabled when set to zero)	0 Hz	Sets the frequency at which the V/F adjustment factor in P-26 has full effect. This allows the motor voltage applied at the frequency in P-29 to be increased or decreased by the factor set in P-26.	
P-30	Drive start mode	Edge-r: Close Digital input 1 *after* power up to start drive Auto-0: drive runs whenever Digital input 1 closed. Auto-1..4: as Auto-0, except 1..4 Attempts to restart after a trip	Auto-0	When set to Edge-r, if drive is powered up with Digital input 1 closed (enabled), drive will not run. The switch must be 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..4 makes 1..4 attempts to automatically restart after a trip (20s between attempts). If fault has cleared drive will restart. Drive must be powered down to reset auto reset counter.	
P-31	DC injection voltage	0.1 to 20% of max voltage	10%	If P-05 selection is 'ramp to stop', P-31 sets the level of DC braking applied when the ramp reaches zero.	
P-32	DC injection braking time	0 to 60s	0s	If P-05 selection is 'ramp to stop', P-32 sets the duration of DC braking applied when the ramp reaches zero.	
P-33	DC injection on enable	0: Inactive 1: Enabled	0	When 1, DC injection is applied whenever the drive is enabled	
P-34	External Brake Resistor	0: No brake resistor fitted 1: Optidrive braking resistor 2: Customer specified resistor	0	Activates the internal braking transistor. When P-34 =1 the braking resistor is protected by the drive against overload. When P-34 = 2, a thermal overload relay must be used to protect the resistor and drive.	
P-35	Speed reference scaling factor (analog or digital)	20% to 250% (40% to 500% if P-01 > 2.5x P-09)	100%	Scales the analog input at control terminal 6 up or down, or the digital reference in keypad (or Slave) mode up or down.	
P-36	Drive address (s-comms)	0 to 63	1	Distinct drive address for serial comms. 0 = comms disabled.	
P-37	Access code definition	0 to 9999	101	Defines Extended Parameter Set access code, P-14.	
P-38	Parameter access lock	0: Parameters can be changed, auto-saved on power down 1: Parameter changes not saved on power down 2: Read-only. No changes allowed.	0 (write access and auto-save are enabled)	Controls user access to parameters. When P-38 = 0, all parameters can be changed and these changes will be stored automatically. When P-12 = 1, changes may be made but these will not be stored when the Optidrive powers down. When P-38 = 2, parameters are locked and cannot be changed, preventing unauthorised access.	
P-39	Hours run meter	0 to 99999 hours	Read only	Not affected by reset-to-default command.	
P-40	Drive identifier	Drive rating/Software version	Read only	Power, size and software version codes.	

PARAMETER ZERO

Par.	*Description*	*Range*	*Default*	*Explanations*		*Set to*
P-00	Provides a *read only* window into the drive. Access, scroll, change and exit are as for any other parameter. The selected variable is indicated at the left hand side of the display.	1 to 9	1	1 Unscaled analog input	%	
				2 Speed reference from scaled (P-35) analog input	Hz	
				3 Pre-ramp speed reference	Hz	
				4 Post-ramp speed reference	Hz	
				5 Slip speed	Hz	
				6 Stator field frequency	Hz	
				7 Applied motor voltage	V	
				8 DC bus voltage	V	
				9 Optidrive internal thermistor (NTC) value		

OPTIDRIVE DATA – Motors 0.37 to 2.2kW, single and 3-phase 230V

Size		*1*	*1*	*1*	*1*	*2*	*2*
Optidrive model reference	OD-xxxxx-IN	12037	12055	12075	12110	22150	22220
Supply voltage +/-10%		220-240	220-240	220-240	220-240	220-240	220-240
Phases		1 or 3	1 or 3	1 or 3	1 or 3	1 or 3	1 or 3
Motor output rating	kW	0.37	0.55	0.75	1.1	1.5	2.2
Motor output rating	HP (nom.)	0.5	0.75	1.0	1.5	2.0	3.0
Output current	A	2.3	3.1	4.3	5.8	7.0	10.5
Fuse or MCB rating 3-phase	A	5	5	5	10	10	10
Fuse or MCB rating 1-phase	A	10	10	10	20	20	30
Max. amb. temp. °C for switching	°C at 16kHz	50	50	40	40	50	40
freq. >8kHz.	°C at 32kHz	50	40	30	30	40	30
Motor cable size	mm^2	1.0	1.0	1.0	1.5	1.5	1.5
Maximum motor cable length	m	50	50	50	100	100	100
Weight	kg	1.0	1.0	1.0	1.0	2.5	2.5
Min. Braking Resistor	Ω	n/a	n/a	n/a	n/a	33	22

GENERAL TECHNICAL DATA

- Supply frequency 48 to 62 Hz.
- Maximum permissible 3-phase supply imbalance 3%.
- Max. ambient temperature 50 °C.
- Relative humidity must be less than 95% (non-condensing).
- Max. altitude 2000 m.
- Derate above 1000 m, 1% per 100 m.
- Derate output current 5%/°C above max. ambient temp (see * table) up to 50°C max
- I x t protection above 100% output current.
- 150% overload protection for 60 sec.
- 175% overload allowable for 2 sec.
- Storage temperature range -40 to +60 °C.

OPTIDRIVE DATA – Motors 0.75 to 37.0kW, 3-phase 400V

Size	*1*	*1*	*2*	*2*	*2*	*2*	*3*	*3*	*3*	*3*	*4*	*4*	*4*	*4*
OD-xxxxx-IN	14075	14150	24075	24150	24220	24400	34055	34075	34110	34150	44185	44220	44300	44370
Volts +/-10%	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480	380-480
Phases	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Output KW	0.75	1.5	0.75	1.5	2.2	4.0	5.5	7.5	11.0	15.0	18.5	22.0	30.0	37.0
HP (nom.)	1.0	2.0	1.0	2.0	3.0	5.5	7.5	10	15	20	25	30	40	50
Output A	2.2	4.1	2.2	4.1	5.8	9.5	13.0	16.0	26.0	29.5	39	46	61	72
MCB rating A	5	10	5	10	10	16	20	32	40	40	50	60	80	100
Max°C at 16kHz	40	40	50	40	50	40	50	40	20	-	40	30	20	-
Max°C at 32kHz	30	30	50	30	50	30	-	-	-	-	-	-	-	-
Cable size mm^2	1.0	1.0	1.0	1.0	1.5	1.5	2.5	2.5	4	6	10	10	16	16
Cable length m	10	10	50	100	100	100	100	100	100	100	100	100	100	100
Weight Kg	1.0	1.0	2.5	2.5	2.5	2.5	5.0	5.0	5.0	5.0	25	25	26	26
Min brake R Ω	-	-	47	47	47	33	22	22	22	22	12	12	12	12

DIGITAL INPUTS

P-19	*Input 1 function*	*Input 2 function*	*Input 3 function*
0	*Open:* Stop (disable) *Closed:* Run (enable)	*Open:* Analog speed reference *Closed:* Preset / Jog Speed 1	*Open:* Voltage analog input *Closed:* Current analog input
1	*Open:* Stop (disable) *Closed:* Run (enable)	*Open:* Analog speed reference *Closed:* Preset / Jog Speed 1 or 2, selected by Digital Input 3	*Open:* Preset / Jog Speed 1 *Closed:* Preset / Jog Speed 2
2	*Open:* Stop (disable) *Closed:* Run (enable)	Digital Input 2 *Open* + Digital Input 3 *Open* = Preset / Jog Speed 1 Digital Input 2 *Closed* + Digital Input 3 *Open* = Preset / Jog Speed 2 Digital Input 2 *Open* + Digital Input 3 *Closed* = Preset / Jog Speed 3 Digital Input 2 *Closed* + Digital Input 3 *Closed* = Preset / Jog Speed 4	
3	*Open:* Stop (disable) *Closed:* Run (enable)	*External trip input:* *Open:* TRIP; *Closed:* no trip.	*Open:* Analog speed reference *Closed:* Preset / Jog Speed 1
4	*Open:* Stop (disable) *Closed:* Run (enable)	*Open:* Run forward *Closed:* Run reverse	*Open:* Analog speed reference *Closed:* Preset / Jog Speed 1
5	*Open:* Fwd Stop (disable) *Closed:* Fwd Run (enable)	*Open:* Reverse Stop (disable) *Closed:* Reverse Run (enable)	*Open:* Analog speed reference *Closed:* Preset / Jog Speed 1
6	*Open:* Stop (disable) *Closed:* Run (enable)	*Open:* Run forward *Closed:* Run reverse	*External trip input:* *Open:* TRIP; *Closed:* no trip.
7	*Open:* Fwd Stop (disable) *Closed:* Fwd Run (enable)	*Open:* Reverse Stop (disable) *Closed:* Reverse Run (enable)	*External trip input:* *Open:* TRIP; *Closed:* no trip.
8	*Open:* Stop (disable) *Closed:* Run (enable)	*Open:* Run forward *Closed:* Run reverse	*Open:* Preset / Jog Speed 1 *Closed:* Preset / Jog Speed 2
9	*Open:* Fwd Stop (disable) *Closed:* Fwd Run (enable)	*Open:* Reverse Stop (disable) *Closed:* Reverse Run (enable)	*Open:* Preset / Jog Speed 1 *Closed:* Preset / Jog Speed 2
10	Normally Open (N.O.) Momentary close to run (Enable)	Normally Closed (N.C.) Momentary open to Stop (disable)	*Open:* Analog speed reference *Closed:* Preset / Jog Speed 1

- 'Forward' speed is defined as clockwise rotation looking at the shaft end of the motor.
- When P-19 = 0 the analog input will be configured for 0-10V when Digital Input 3 is open. When Digital Input 3 is closed, the analog input assumes a 4-20mA format if P-16 is set to 0-10V, otherwise the analog input will be configured for the format set in P-16. For P-19 > 0, the analog input is defined by the setting of P-16.
- P-19 = 5, 7 or 9 selects the 'wire break' stop function. Opening digital input 1 or 2 (eg wire break) will disable the drive. This setting also activates the fast stop ramp (P-07) when digital inputs 1 and 2 are closed simultaneously.

TROUBLESHOOTING

TO CLEAR A TRIP CONDITION Remove the condition which caused the trip and press the STOP key. The drive will restart according to the mode selected by P-30.
If the motor is stopped and the display shows StoP, there is no fault; the drive output is disabled and ready to run.
NOTE: If the application requires terminals 1 and 2 to be permanently connected, P-30 must be set to "Auto-0".

Fault Code	*What has happened*	*What to do*
P-deF	Default parameters loaded.	Press STOP key to acknowledge and enter parameter values.
O-I	Over current on drive output. Excess load on the motor.	*Motor at constant speed:* investigate overload or malfunction. *Motor starting:* load stalled or jammed. *Motor accelerating/decelerating:* accel/decel time too short. Check for star-delta motor wiring error.
O-Uolt	Over voltage on DC bus.	Supply problem, or increase decel ramp time P-04.
U-Uolt	Under voltage on DC bus.	This occurs routinely when power is switched off. If it occurs during running, check power supply voltage.
OI-b	Brake resistor short circuit.	Check cabling first. If ok, check resistor for burn out.
I.t-trP	Overload. 150% current for >1 min.	Check driven machine; drive may be too small for the load
th-Flt	Faulty thermistor on heatsink.	*Refer to your IDL Authorised Distributor.*
E-triP	External trip (on digital input 2 or 3)	External trip on digital input – see P-19 (motor thermistor ?)
EE-F	EEPROM fault. Parameters not saved, defaults reloaded.	Try again. If problem recurs, *refer your IDL Authorised Distributor.*
PS-Flt	Internal power stage fault.	*Refer to your IDL Authorised Distributor.*
O-t	Heatsink over temperature.	Check drive ambient temp. Added space or cooling needed?
Ain-F	Hardware fault.	*Refer to your IDL Authorised Distributor.*
Iin-F	Current analog input out of range	Check input current in range defined by P-16
OL-br	Braking Resistor Overload	Increase decel. time, P-04 or reduce braking resistor value
SC-trP	Serial communications trip	Check OptiLink integrity between drives connected optically

Acceleration/ deceleration: Very short ramp times may require >150%. This may result in the accel/decel rate not being achieved, and/or O-I fault.
Overload protection: When the drive is delivering >100% full load current, an I.t integral will result in the drive tripping, should the I.t limit be exceeded. This occurs after 1 minute at 150%. When overloaded, the Optidrive display will flash.

OPTIDRIVE FEATURES

- Speed range 0 to 545Hz (0 to 32,700 rpm).
- Speed regulation 1.0%.
- On-board brake module (sizes 2, 3 and 4 only).
- Power output constant torque or fan/pump characteristic.
- Drive efficiency typically 95%
- Motorised potentiometer function
- Independent fast ramp to stop

CONTROL FEATURES

- Three programmable digital inputs.
- One bipolar analog input (voltage or current).
- One analog output (current or speed).
- One programmable output relay.
- Analog input update time less than 8 ms.
- Control terminals galvanically isolated to >2.5kV
- Control terminal outputs short-circuit-proof.
- Four preset speeds selectable.
- Auto restart selectable.
- Skip frequencies selectable.
- Near-silent motor running (32kHz effective switching frequency).
- Selectable switching frequencies 8, 16, 32kHz

OPTIDRIVE OPTIONS

The following additional products are available:

- Additional EMC filters to EN 50081-1 and EN 50081-2 (industrial) for long motor cables.
- LCD infrared remote control unit 'Optiwand'.
- Multi-language LCD display and parameter copy facility in Optiwand.
- Braking resistor (sizes 2, 3 & 4 Optidrive).
- RS232/485 serial communications unit.
- Profibus DP communication unit.
- DeviceNet communication unit.

For further information, please consult your IDL authorised dealer.

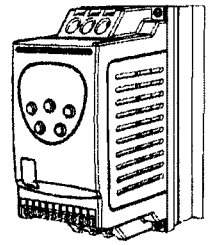
CONFORMITY with STANDARDS

- CE-marked for Low Voltage Directive.
- IEC 664-1 Insulation Coordination within Low Voltage Systems.
- UL 840 Insulation coordination for electrical equipment.
- EN50081-2 EMC Generic Emissions Standard, Industrial Level.
- EN50082-2 EMC Generic Immunity Standard, Industrial Level.
- Enclosure ingress protection, EN60529 IP20, NEMA 250.
- Flammability rating according to UL 94.

G O Jones, Technical Director

INVERTEK DRIVES LTD

OPTIDRIVE™



User Guide

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation, or adjustment of the optional operating parameters of the drive or from mismatching of the drive to the motor.

The contents of this User Guide are believed to be correct at the time of printing. In the interests of a commitment to a policy of continuous improvement, the manufacturer reserves the right to change the specification of the product or its performance or the contents of the User Guide without notice.

SAFETY

This variable speed drive product (Optidrive) is intended for professional incorporation into complete equipment or systems. If installed incorrectly it may present a safety hazard. The Optidrive uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical plant that may cause injury. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction.

System design, installation, commissioning and maintenance must be carried out only by personnel who have the necessary training and experience. They must read carefully this safety information and the instructions in this Guide and follow all information regarding transport, storage, installation and use of the Optidrive, including the specified environmental limitations.

Please read the IMPORTANT SAFETY INFORMATION below, and all Warning and Caution boxes elsewhere.

SAFETY NOTICES

WARNING is given where there is a hazard that could lead to injury or death of personnel.

CAUTION is given where there is a hazard that could lead to damage to equipment.

IMPORTANT SAFETY INFORMATION

Safety of machinery, and safety-critical applications

Optidrive hardware and software are designed and tested to a high standard and failures are unlikely.

WARNING The level of integrity offered by the Optidrive control functions – for example stop/start, forward/reverse and maximum speed, is not sufficient for use in safety-critical applications without independent channels of protection. All applications where malfunction could cause injury or loss of life must be subject to a risk assessment and further protection provided where needed. Within the European Union, all machinery in which this product is used must comply with Directive 89/392/EEC, Safety of Machinery. In particular, the electrical equipment should comply with EN60204-1.

Electromagnetic Compatibility (EMC)

Optidrive is designed to high standards of EMC. EMC data is provided in a separate EMC Data Sheet, available on request. Under extreme conditions, the product might cause or suffer disturbance due to electromagnetic interaction with other equipment. It is the responsibility of the installer to ensure that the equipment or system into which the product is incorporated complies with the EMC legislation of the country of use. Within the European Union, equipment into which this product is incorporated must comply with 89/336/EEC, Electromagnetic Compatibility.

When installed as recommended in this User Guide, the radiated emissions levels of all Optidrives are less than those defined in the Generic radiated emissions standard EN50081-2. When correctly fitted with an Optifilter (Mains filter), the conducted emission levels are less than those defined in the Generic radiated emissions standard EN50081-1 (class B) for screened cable lengths of < 5m and with EN50081-2 (class A) for screened cable lengths of < 25m.

WARRANTY

All Invertek Drives Ltd (IDL) products carry a 2-year warranty, valid from the date of manufacture. This date is clearly visible on the rating label.

Complete Warranty Terms and Conditions are available upon request to your IDL Authorised Distributor.

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Part No. 82-ODMAN-01 Rev 11, ECN0018
April 2000

MECHANICAL INSTALLATION

CAUTION
- Carefully inspect the Optidrive before installation to ensure it is undamaged.
- Store the Optidrive in its box until wanted. Storage should be clean and dry. Temperature range –40°C to +60°C.
- Install the Optidrive on a flat, vertical, flame-resistant vibration-free mounting within an IP54 or equivalent enclosure (EN60529).
- Flammable material should not be placed close to the drive.
- The entry of conductive or flammable foreign bodies should be prevented.

MECHANICAL INSTALLATION

Optidrives can be installed side-by-side with their heatsink flanges touching. This gives adequate ventilation space between them.

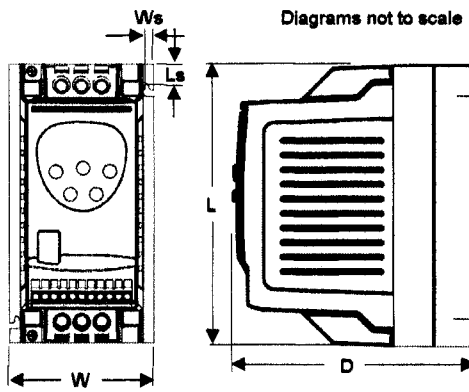
If the Optidrive is to be installed above another drive or any other heat-producing device, the minimum vertical spacing is 100mm.

The enclosure should either be force-ventilated or large enough to allow natural cooling. Allow 0.1 m^3 per kW of drive rating.

Max. ambient temperature 50°C, min. –5°C.

DIMENSIONS

Diagrams not to scale



Optidrive size 1

MECHANICAL DIMENSIONS

	Optidrive Size 1	Optidrive Size 2	Optidrive Size 3	Optidrive Size 4
Length (L)	155mm	260mm	260mm	520mm
Width (W)	80mm	100mm	171mm	340mm
Depth (D)	130mm	175mm	175mm	220mm
Width to screw centre (Ws)	4mm	4mm	4mm	9.5mm
Length to screw centre (Ls)	25mm	25mm	25mm	50mm
Number of fixing screws	2 x M4	2 x M4	4 x M4	4 x M8

ELECTRICAL INSTALLATION

WARNING
- Optidrives should be installed only by qualified electrical persons and in accordance with local and national regulations and codes of practice.
- ***Electric shock hazard!*** Disconnect and ISOLATE the Optidrive before attempting any work on it. High voltages are present at the terminals and within the drive for up to 10 minutes after disconnection of the electrical supply.
- 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 grounding (earthing) connections. See Connections diagram at right.

CAUTION
- Ensure that the supply voltage, frequency and phases (3-ph or single) agree with the rating of the Optidrive as delivered.
- An isolator or other disconnecting device should be installed between the power supply and the drive.
- Never connect the power input cabling to the Optidrive output terminals UVW.
- Protect the drive by slow-blowing HRC fuses or MCB located in the input cabling.
- 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 armouring of power cables is effected in accordance with the Connections diagram at right.
- Ensure that input and output power terminal screws are tightened to 1Nm torque.
- Ensure that control terminal screws are tightened to 0.5Nm torque.

ELECTRICAL INSTALLATION

For connections see Power Connections and Grounding diagram at right.

Refer to the DATA overleaf for the sizes of cabling and wiring. The earth cable must be sufficient to carry the prospective earth fault current.

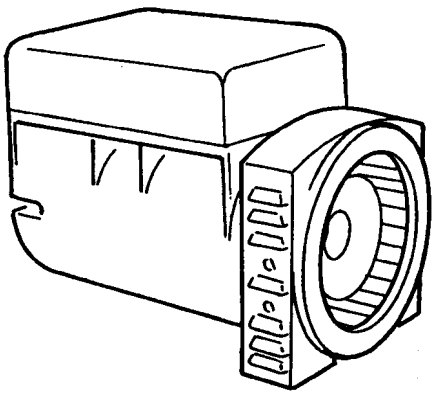
It is recommended that the power cabling should be 3-core or 4-core PVC-insulated screened cable, laid in accordance with local industrial regulations and codes of practice.

GROUNDING (EARTHING)

The ground terminal of each Optidrive should be individually connected DIRECTLY to the site earth (ground) busbar (through the Filter if installed) as shown in the diagram at right. Optidrive ground connections should not loop from one drive to another, or to or from any other equipment. Ground loop impedance must conform to local industrial safety regulations.

CE

mecc alte spa



I

ALTERNATORI SERIE TR1

MANUALE PER L'USO E LA MANUTENZIONE

GB

TR1 SERIES ALTERNATORS

USE AND MAINTENANCE MANUAL

F

ALTERNATEURS SERIE TR1

MANUEL POUR L'ENTRETIEN ET LA MANUTENTION

D

GENERATOREN DER BAUREIHE TR1

HANDBUCH FÜR DIE BEDIENUNG UND WARTUNG

E

ALTERNADORES DE LA SERIE TR1

MANUAL PARA EL USO Y MANTENIMIENTO

TR1

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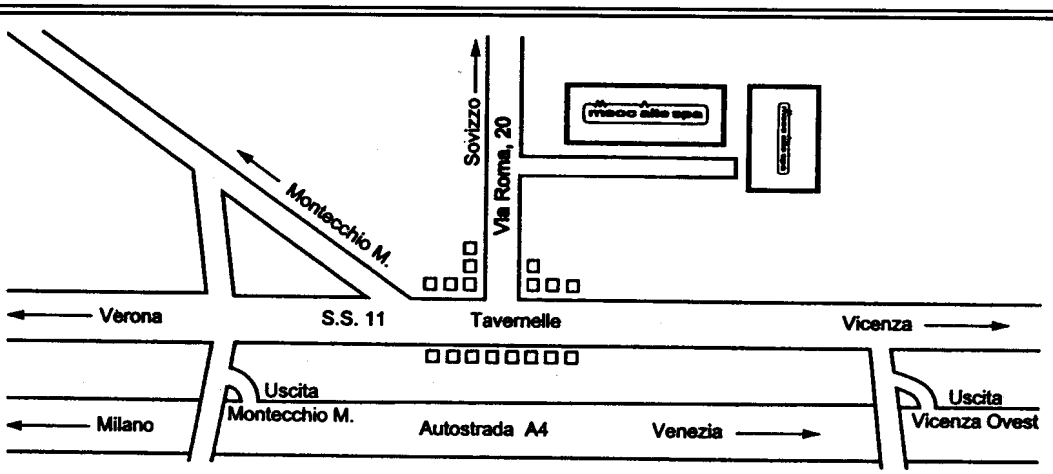

Marzo 1999 - rev. 01

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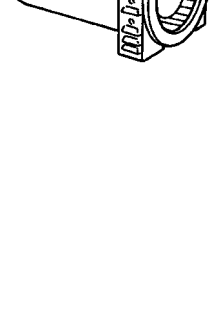


MACHINE DESCRIPTION

The alternators TR1 are brushless with regulation compound on three phases, 2 pole.
TR1 alternators are made in compliance with the 89/392, 73/23, 89/336 directives and their amendments, and the EN 60034-1, CEI 2-3, IEC 34-1, VDE 0530, BS4999-5000, N.F. 51.111 regulations.
The end brackets are diecast in high resistance alluminum alloy, the shaft is in C45 steel and it has fixing ring.
The mechanical protection level meets standard IP23 (upon request higher levels of protection can be supplied).
The insulation is class H and the windings are impregnated with epoxy resins.
The standard generators comply with the specification VDE 0875 degree "G" and "N" and with the basic safety requirements of the European regulation on electromagnetic compatibility; by applying the European standards EN 50081-1 and EN 50082-1 we comply with the above mentioned regulation.
On request we can supply filtres for more restrictive specifications such as VDE 0875, degree "K", MIL 461-462 D, etc..

INTRODUCTION

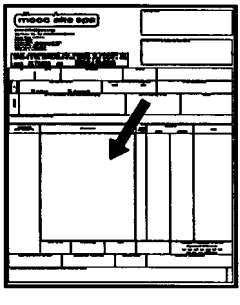
The TR1 alternators comply with the EEC 89/392, 73/23, 89/336 directives and their amendments; therefore they pose no danger to the operator if they are installed, used and maintained according to the instructions given by Mecc Alte and provided the safety devices are kept in perfect working conditions.

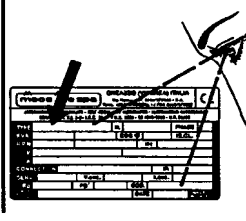
Therefore a strict observance of these instructions is required.

When the alternator is delivered, check that unit conforms with the delivery note and ensure that there are no damaged or defective parts; should there be any, please inform the forwarding agent, the insurance company the seller or Mecc Alte immediately.

Always indicate the generator type and code when contacting Mecc Alte or the authorized after-sales service centres.

Any packing materials should be disposed of via correct waste disposal methods. Do not discard waste materials into the enviroment.





ACCOPPIAMENTO MECCANICO

Nel caso di accop-piamento di un generatore serie TR1 avente forma costruttiva B3/B9 seguire le seguenti istruzioni:

-) montare il coperchio anteriore sul motore fissandolo con le apposite viti e applicando una coppia di serraggio di 48±7% Nm se si impiegano viti M10 o 21±7% Nm nel caso di viti M8 (fig. 1).

-) bloccare l'alternatore sul coperchio fissando i quattro dadi M8 sui tiranti, applicando una coppia di pari a 16±7% Nm (fig. 2).

-) avvitare il dado autobloccante sul tirante centrale ed inserire quest'ultimo nella sua sede (fig.3).

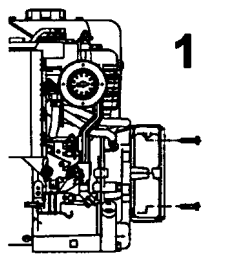
-) bloccare il tirante centrale applicando sul dado M8 una coppia di serraggio pari a 21±7% Nm; rimontare le retine di protezione laterali e la griglia di chiusura posteriore applicando sulle viti M5 una coppia di serraggio pari a 3,5±7% Nm (fig. 4).

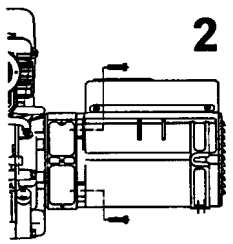
MESSA IN SERVIZIO

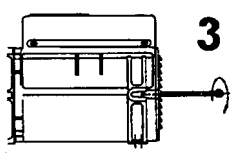
Nella messa in servizio aver cura, che le aperture di aspirazione e scarico dell'aria di raffreddamento siano sempre libere.
Per il collegamento elettrico alle prese o l'eventuale quadretto del generatore, utilizzare spine e cavi adeguati.
Per il collegamento terra è prevista anche la possibilità di utilizzare un foro presente sul coperchio posteriore, che è accessibile senza dover smontare la cuffia.

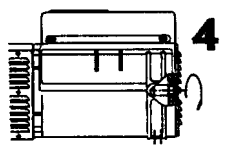
IMPORTANZA DELLA VELOCITA'

La frequenza e la tensione dipendono direttamente dalla velocità di rotazione; è perciò necessario che sia mantenuta il più possibile costante al suo valore nominale con qualsiasi carico. Il sistema di regolazione della velocità dei motori di trascinamento presenta in generale una leggera caduta di velocità tra vuoto e carico; è perciò raccomandabile regolare la velocità a vuoto di un 3÷4% superiore alla velocità nominale, per avere a pieno carico il valore nominale.









MECHANICAL COUPLING

When coupling with an TR1 series generator having a B3 / B9 form, follow the instructions below:

-) mount the front cover on the motor, fixing it with the appropriate screws and applying a tightening torque of 48 ± 7% Nm if using M10 screws or 21 ± 7% Nm for M8 screws (fig.1).

-) lock the alternator into the cover by fixing the four M8 nuts onto the bolts, applying a tightening torque of 16 ± 7% Nm (fig.2).

-) screws the self-locking nut onto the central bolt and insert the latter into its housing (fig. 3).

-) lock the central bolt by applying a tightening torque of 21±7% Nm to the M8 nut; reassemble the lateral protective nets and the rear closing grid by applying a tightening torque of 3,5±7% Nm to the M5 screws (fig. 4).

START UP

Make sure, when starting up, that cooling air intake and discharge openings are free and unblocked.
For the electrical connections at the plugs or the possible dial of the alternator, to utilize plugs and cables adequates.
For ground connection there is hole in the upper part of the end bracket which is accessible without having to remove end cover.

THE IMPORTANCE OF SPEED

Frequency and voltage depend directly on rotational speed. This must be kept as constant as possible on its nominal value no matter what the load.
Drive-motor speed control system generally have a small drop in speed between no-load and loaded conditions.
We therefore recommend setting no-load speed 3÷4% above nominal speed.

ACCOUPLEMENT MECANIQUE

En cas de montage d'un générateur série TR1 ayant la forme constructive B3 / B9, suivre les instructions suivantes:

-) monter le couvercle avant sur le moteur en la fixant avec les vis prévues à cet effet et en appliquant un couple de serrage de 48±7% Nm si on utilise des vis M10 ou de 21±7 % Nm en cas de vis M8 (fig.1).

-) bloquer l'alternateur sur le couvercle en fixant les quatres écrous M8 sur les tirants, en appliquant un couple de serrage de 16 ±7% Nm (fig. 2).

-) visser l'écrou autobloquante sur le tirant central et enfiler ce dernier dans son logement (fig. 3).

-) bloquer le tirant central en appliquant à l'écrou M8 un couple de serrage de 21 ± 7% Nm ; remonter les grilles de protection laterales et la grille de fermeture arriére en appliquat aux vis M5 un couple de serrage de 3,5 ±7% Nm (fig. 4).

MISE EN SERVICE

S'assurrer que les couvercles de ventilation ne sont pas obstruées.
Pour les raccordements électriques aux prises ou à l'eventuel boite de l'alternateur, utiliser prises et cables adéquates.
Pour le raccordement à la masse il est prévu sur la partie supérieure un trou accessible sans avoir à démonter le couvercle.

IMPORTANCE DE LA VITESSE

La fréquence et la tension dépendent de la vitesse de rotation. Celle-ci doit étre maintenue la plus constante possible, quelquesoit la charge. Géneralment le système de régulation des moteurs thermiques est tel qu'il y a une différence de vitesse entre vide et charge. Nous recommandons de régler la vitesse à vide à 3 ou 4 % dessus de la vitesse nominale, pour avoir à pleine charge la vitesse nominale.

MECHANISCHER ANSCHLUß

Bei Anschluß einses Generators der Serie TR1 mit Bauform B3/B9 müssen die folgenden Answeisungen befolgt werden:

-) den vorderen Deckel auf den Motor stzen und ihn mit Hilfe der entsprechenden Schrauben und einem Anzugsmoment von 48±7% Nm festziehen, wenn Schrauben M10 verwendet werden, oder aber mit einem Anzugsmoment von 21±7% Nm bei Verwendung von Schrauben M8 (abb. 1).

-) Den Umwandler auf dem Deckel befestigen und ihn mit Hilfe der vier Schraubmuttern M8 an den Zugstangen befestingen bei Aufbringen eines Anzugsmoments von 16 ± 7% Nm (abb. 2).

-) die Stoppschraubmutter auf die mittlere Zungstange schrauben und diese in ihirem Sitz positionieren (abb. 3).

-) die mittlere Zungstange blockieren und hierfür ein Anzugsmoment von 21 ± 7% Nm auf die Schraubmutter aufbringen; die seitlichen Schutznetze sowie das hintere Abschlußrost wieder aufsetzen und hierfür ein Anzugsmoment von 3,5 ±7% Nm auf die Schrauben M5 aufbringen (abb. 4).

INBETRIEBNAHME

Bei der Inbetriebnahme ist zu gewährleisten, daß die öffnungen für die ansaugung bzw. für den austritt der kühlluft immer frei bleiben.
Grunde ist die Machine nur mit Verbrennungsschutz-handschuhenzu berühren.
Hinsichtlich der Erdung ist auf der oberen Seite des hinteren Deckels ein zugängliches Loch vorgesehen, so daß die Haube nicht abgenommen werden muß.

DIE WICHTIGKEIT DER DREHZAHL

Die Frequenz und die Spannung sinddirekt von der Drehzal abhänging, daher ist es wichtig, daß sie so konstant wie möglich auf ihrem Nominalwert gehalten werden, unabhänging von jeglicher Last.
Generell weist das Regelsystem der Antriebsmotoren einen leichten Abfall der Geschwindigkei bei Last gegenüber Leerlauf; daher ist es ratsam, die Geschwindigkeit bei Leerlauf 3-4% höher zu stellen, Nals die Nominalgeschwindigkeit.

ACOPLAMIENTO MECANICO

En el caso de acoplamiento de un generador serie TR1 con forma constructiva B3/B9, siga las instrucciones siguientes:

-) monte la tapa anterior encima del motor sujetàndolacon sus tornillos y aplicando un par de apriete de 48±7% Nm si utiliza tornillos M10, o de 21 ±7% Nm si utiliza tornillos M8 (fig.1).

-) sujete el alternador en la tapa fijando las cuatros tuercas M8 en los tirantes, aplicando un par de apriete de 16 ±7% Nm (fig. 2).

-) enrosque la tuerca autobloqueante en el tirante central e introduzca este ùltimo en su lugar (fig. 3).

-) sujete el tirante central aplicando en la tuerca M8 un par de apriete de 217% Nm; vuelva a montar las redecillas de protección laterales y la reija de cierre posterior, aplicando a los tornillos M5 un par de apriete de 3,5 ±7% Nm (fig.4).

PUESTA IN SERVICIO

En la puesta in servicio asegurarse que la aberturas de aspiracion y descarga del aire de refrigeracion se encuentren siempre libres de obstaculos.
Por las conexiones eléctricas a los spines a caja de generador utilizare spine y cables adequadi.
Para la conexiòn a masa se provee sobre la parte superior de la tapa posterior un orificio accessible, sin tener que desmontar la copertura.

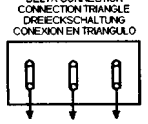
IMPORTANCIA DE LA VELOCIDAD

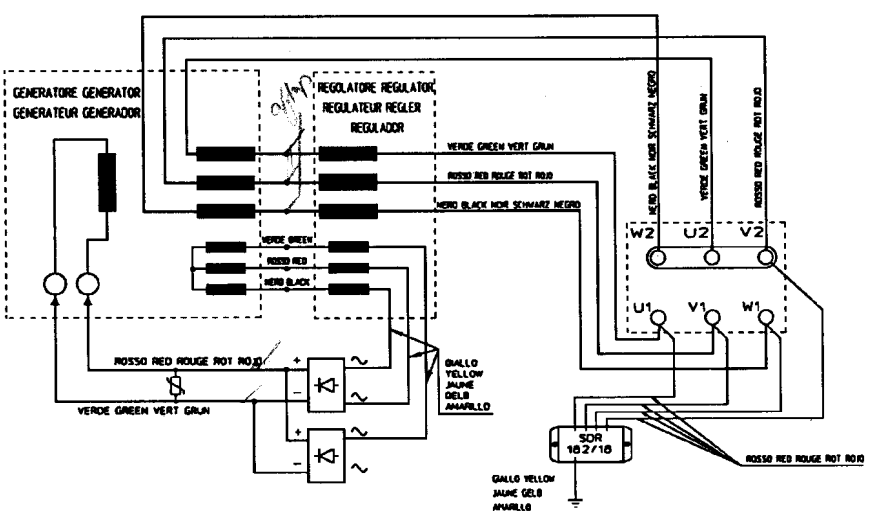
La frecuencia y la tension dependen de la velocidad de rotacion. Esta debe ser mantanida lo mas constante posible en su valor nominal sea cual sea. Generalmente el sistema de regulacion de los motore termicos es tal que exsiste una diferencia de velocidad entre vacio y carga. Recomendamos regular la velocidad sin carga a un 3÷4 % por encima de la velocidad nominal, por hacer a pieno carga la velocidad.

SCHEMA ELETTRICO
WIRING DIAGRAM
SCHEMA ELECTRIQUE
SCHALTSCHEMA
ESQUEMA ELECTRICO

COLLEGAMENTO A STELLA
STAR CONNECTION
CONNECTION ETOILE
STERNSCHALTUNG
CONEXION EN ESTRELLA

COLLEGAMENTO A TRIANGOLO
DELTA CONNECTION
CONNECTION TRIANGLE
DREIECKSCHALTUNG
CONEXION EN TRIANGULO





INCONVENIENTI / PROBLEMS / PANNES STÖRUNG / FALLOS	CAUSE / CAUSES / CAUSES URSACHE / CAUSAS	COME INTERVENIRE / REMEDIES / QUE FAIRE GEGEN-MAßNAHMEN / REMEDIOS
GENERATORE NON SI ECCITA	**Velocità ridotta** **Ponte diodi guasto** **Guasto negli avvolgimenti**	**Controllare i giri e portarli al valore nominale** **Controllare e sostituire** **Controllare la resistenza degli avvolgimenti come da tabella**
GENERADOR DOES NOT EXCITE	Low speed Broken diode bridge Winding breakdowns	Check RPM and set at nominal value Check and replace Check that winding resistance is as shown in the tables
L'ALTERNATEUR NE S'AMORCE PAS	Vitesse trop lente Pont de diode cassè Bobinage détériorés	Regler la vitesse Le tester et le changer Vérifier les valeur à l'aide du tableau
GENERATOR ERREGT SICH NICHT	Reduzierte Geschwindingkeit Defekter Kondensator Defekt an den Wicklungen	Die Drehzahl überprüfen und sie auf ihren Norminalwert bringen Überprüfen und Ersetzen Den Widerstand der Wicklungen
EL ALTERNADOR NO SE EXCITA	Velocidad reducida Puente diodos averiado Averia en los arrollamientos	Contròlense las revoluciones y llévense al valor nominal Contròlense y substitùyase Contròlense la resistencia de los arrollamientos como resulta en la tabla
TENSIONE ALTA A VUOTO	**Velocità eccessiva** **Guasto nel trasformatore**	**Controllare i giri e regolare** **Controllare la resistenza degli avvolgimenti come da tabella**
HIGH NO-LOAD VOLTAGE	Speed too high Regulator transformer breakdown	Check and adjust RPM Check winding resistance, as for tables
TENSION Á VIDE TROP ÉLEVÉE	Vitesse trop rapide Transformateur de régulation dètruit	Règler la vitesse Vèrifier les valeur à l'aide du tableau
HOHE SPANNUNG BEI LEERLAUF	Überhöhte Geschwindigkeit Kondensator mit hoher Kapazität	Die Drehzahl überprüfen und regulieren Überprüfen und ersetzen
ALTA TENSIÓN EN VACIO	Excesiva velocidad Averia en el trasformador regulador	Contòlense las revoluciones y ajùstense Contròlense la resistencia de los arrollamiento como resulta en la tabla
TENSIONE BASSA A VUOTO	**Velocità ridotta** **Diodi del ponte guasti** **Avvolgimenti avariati**	**Controllare i giri e regolare** **Controllare e sostituire** **Controllare la resistenza degli avvolgimenti come da tabella**
LOW NO-LOAD VOLTAGE	Speed to low Broken diodes on bridge Breakdown in windings	Check and adjust RPM Check and replace Check winding resistance, as for tables
TENSION Á VIDE TROP BASSE	Vitesse trop lente Pont de diode détruit Bobinage détérioré	Régler la vitesse Vérifier et changer Vérifier les valeur à l'aide du tableau
NIEDRIGE SPANNUNG BEI LEERLAUF	Reduzierte Geschwindigkeit Defekt an den rotierenden Dioden Fehlerhafte Wicklungen	Die drehzahl überprüfen und regulieren Den Widerstand der Wicklungen Contròlense las revoluciones y ajùstense
BAJA TENSIÓN EN VACIO	Reducida velocidad Diodos del puente averiados Arrollamientos averiados	Contròlense y substitùyase Contròlense la resistencia de los arrollamiento como resulta en la tabla
TENSIONE ESATTA A VUOTO MA BASSA A CARICO	**Velocità ridotta a carico** **Carico troppo elevato**	**Controllare i giri e regolare** **Controllare ed intervenire**
PAPER NO -LOAD BUT LOADED VOLTAGE	Low loaded speed Load too big	Check and regulate RPM Check and change
TENSION Á VIDE CORRECTE, MAIS BASSE EN CHARGE	Vitesse en charge incorrecte Charge trop importante	Vérifier et régler la vitesse Vérifier la charge
EXAKTE SPANNUNG BEI LEERLAUF JEDOCH NIEDRIGE BEI LAST	Reduzierte Geschwindigkeit bei Last Zu hohe Last	Die Umdrehungen überprüfen und regulieren Überprüfen und eingreifen
TENSIÓN EXACTA EN VACIO, PERO BAJA CON CARGA	Reducida velocidad con carga Carga demasiado elevada	Contròlense las revoluciones y ajùstense Contròlense y hògase la intervenciòn que necesite
TENSIONE ESATTA A VUOTO MA ALTA A CARICO	**Velocità elevata a carico**	**Controllare i giri e regolare**
PROPER NO-LOAD BUT HIGH LOADED VOLTAGE	High speed	Check and regulate RPM
TENSION Á VIDE CORRECTE, MAIS TROP ÉLEVÉE EN CHARGE	Survitesse moteur	Régler la vitesse
EXAKTE SPANNUNG BEI LEERLAUF JEDOCH HOHE BEI LAST	Erhöhte Geschwidigkeit Bei Last	Die Umdrehungeng überprüfen und regulieren
TENSIÓN EXACTA EN VACIO, PERO ALTA CON CARGA	Elevada velocidad con carga	Contròlense las revoluciones y ajùstense
TENSIONE INSTABILE	**Contatti incerti** **Irregolarità di rotazione**	**Controllare le connessioni** **Verificare l'uniformità di rotazione**
UNSTABLE VOLTAGE	Poor contacts Uneven rotation	Check connections Check for uniform rotation speed
TENSION INSTABLE	Muvais contacts Vitesse instable	Vérifier les contacts Vérifier l'uniformitè de rotation
SCHWANKENDE SPANNUNG	Unsichere Kontakte Ungleichmäßige Rotation	Die Anschlüsse überprüfen Die Rotationsuniformität überprüfen
TENSIÓN INESTABLE	Contactos incostantes Irregularidad de rotaciòn	Contròlense las conexiones Averigüese la uniformidad de rotacion
GENERATORE RUMOROSO	**Cuscinetti avariati** **Accoppiamento difettoso**	**Sostituire** **Verificare e riparare**
NOISY GENERATOR	Broken bearings Poor coupling	Replace Check and repair
ALTERNATEUR BRUYANT	Roulement cassé Accouplement défecteux	Le remplacer Le vérifier et le changer éventuellement
GERÄUSCHE AM GENERATOR	Defekte Lager Falsche Kupplung	Ersetzen Überprüfen und reparieren
GENERADOR RUIDOSO	Coijnetes averiados Acoplamiento defectuoso	Substitùyase Averigüese y repàrese

CARATTERISTICHE / CHARACTERISTICS / CARACTERISTIQUES / TECNISCHE MERKMALE / CARACTERISTICAS

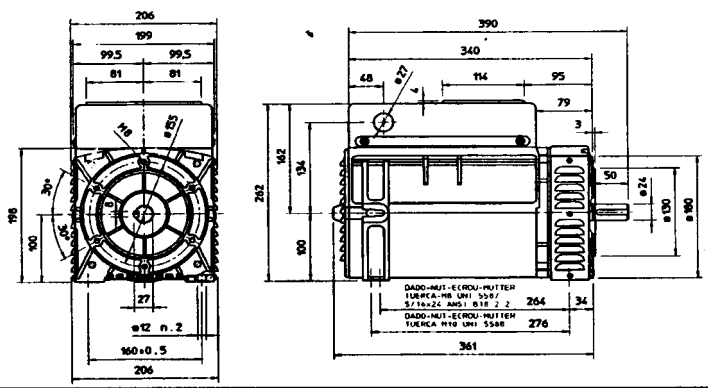
3000 RPM 230/400 V 50 Hz

Tipo Type Type Typ Tipo	kVA	Statore Stator Estator	Rotore Rotor	Avvolgimento ausiliario Auxiliary winding enroulement auxiliaire Hilfs wicklung Bobinado auxiliar	Regolatore compound / Compound regulator / Regulation compound / Compound regler / Regulador compound Potenza Rating Puissance Leistung Potencia	 Eccitazione Excitation Exitation Erregung Excitation	Volume d'aria Air volume Volume d'air Luftmenge Volumen de aire	Rumore Noise Bruit Gerausch Ruido 7m	 1m	Peso Weight Poids Gewicht Peso
		Ω	Ω	Ω	Ω	Ω	m³/min	dBA	dBA	Kg
TR1-130	5,5	2,02	21,5	1,4	0,259	1,74	3,28	60	78	30,8
TR1-160	6,5	1,53	24	1,8	0,134	1,74	3,28	60	78	34,7

DIMENSIONI DI INGOMBRO / OVERALL DIMENSIONS / ENCOMBREMENT / BAUMASSE / DIMENSIONES MAXIMAS

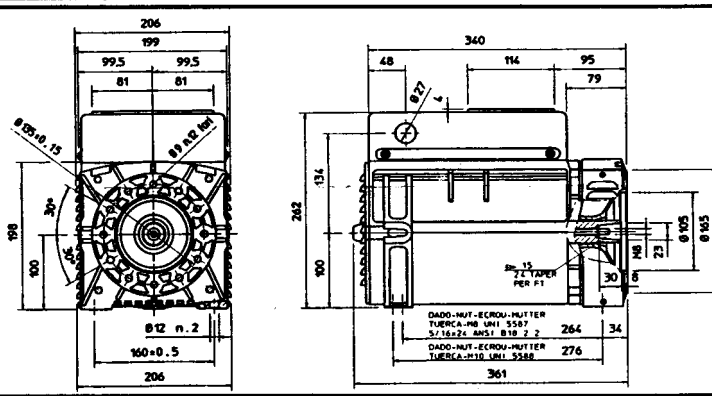
dimensions in mm.

FORMA
FORM
FORME
B14



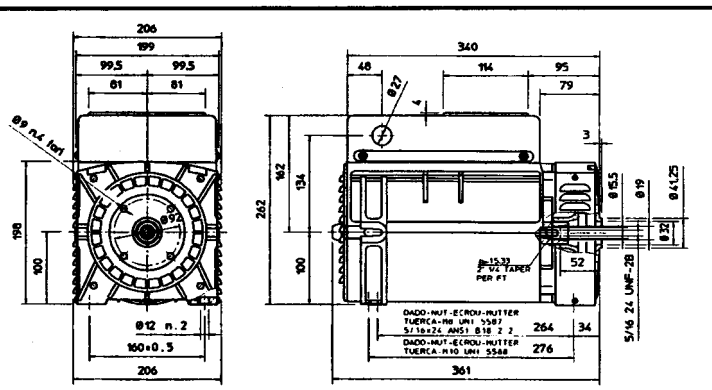
dimensions in mm.

FORMA
FORM
FORME
B9/c23



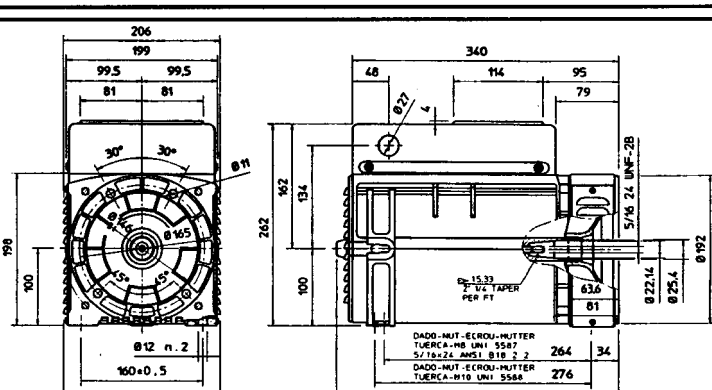
dimensions in mm.

FORMA
FORM
FORME
j609a



dimensions in mm.

FORMA
FORM
FORME
j609b

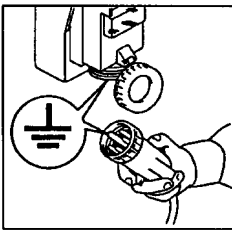


SAFETY REQUIREMENTS

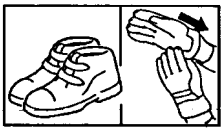
Before any cleaning, lubrication or maintenance operation, ensure that the generator is stationary and disconnected from the power supply.

CAUTION

THE FINAL INSTALLER IS RESPONSIBLE FOR THE INSTALLATION OF ALL THE PROTECTIONS (SECTIONING DEVICES, PROTECTIONS AGAINST DIRECT AND INDIRECT CONTACTS, OVERCURRENT AND OVERVOLTAGE PROTECTIONS, EMERGENCY STOP, ETC.) NECESSARY FOR THE MACHINE TO COMPLY WITH THE EXISTING INTERNATIONAL / EUROPEAN SAFETY REGULATIONS.



This is the reason why you must make sure that the grounding system is in good conditions and in compliance with the regulations of the country where the generator will be installed.

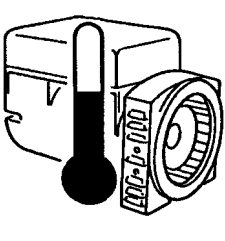


The people in charge of the handling must always wear work gloves and safety shoes. In case the generator or the whole plant must be lifted from the floor, the operators must wear a safety helmet.

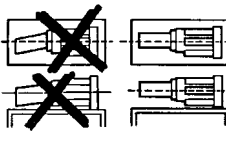
Both packed and unpacked alternators shall be stored in a cool and dry room, and shall never be exposed to the inclemency of the weather.

PLEASE NOTE

IN CASE ALTERNATOR HAS BEEN STORE FOR A LONG TIME AND IN ORDER TO AVOID DAMAGES CAUSED BY HUMIDITY WE SUGGEST THAT THROUGH A 500V MEGGER THE INSULATION RESISTANCE OF ALL WINDINGS BE CHECKED TOWARDS GROUND, INCLUDING THE ROTOR. THE RESULTING DATA MUST BE HIGHER THAN 1 MΩ. IF DATA ARE NOT HIGHER THAN SAID VALUE THEN APPLY A STREAM OF WARM AIR TO THE WINDINGS TILL THE ABOVE MENTIONED VALUE IS OBTAINED.

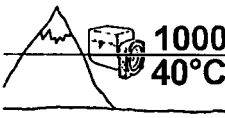


The generator must be installed in an airy room.
If there is not enough air, a malfunction or an overheating may occur.

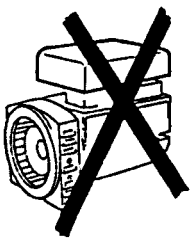


The alternator should be securely connected and perfectly aligned with the prime mover, otherwise dangerous vibrations may occur.

Once the generator is coupled with an engine, mounted on a baseframe, the relevant instructions for lifting the complete generating set, should be followed.



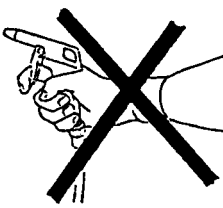
The machine has been designed to ensure the rated output when it is installed in rooms having a max temperature of 40°C and at an altitude not exceeding 1000 meters; in case of different conditions, please make reference to our catalogue (brochure).



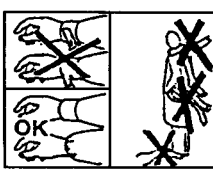
The generators must never and for no reason run with the casing removed.

The generators produce heat proportional to the output.
Therefore, do not touch the generator if you do not wear antiscorch gloves and, after switching it off, do not touch it until it has cooled down.

DANGER OF SHORT CIRCUIT
The degree of protection of the generator is IP23; short circuits may occur if liquids are spilt on to areas containing electrical parts.



Do not clean the inside electric components with compressed air, because this may cause short circuits or other anomalies.



No person must wear fluttering clothes (such as scarves, etc.) near the machine and any garment must be fastened with elastic bands at its ends.

Do not lean or sit on the generator for whatever reason.

Even if all the machine components are protected, keep away from the machine.
Do not remove the labels for whatever reason; on the contrary, if necessary, replace them.

When the machine is worn cut, contact the companies in charge of the disposal of ferrous material and do not throw away its parts into the environment.

In case of replacement of spare parts, use original spare parts only.

DICHIARAZIONE DI CONFORMITA' CE	CE CONFORMITY DECLARATION	DECLARATION DE CONFORMITE' CE	CE KONFORMITÄTS ERKLÄRUNG	DECLARACION DE CONFORMIDAD CE
Noi dichiariamo sotto la nostra sola responsabilità che la macchina	We declare under our sole responsability that machine	Nous declarons sous notre responsabilité que la machine	Wir erkären unterunsere Verantwortlichkeit, daß die Maschine	Notros declaramos bajo nuestra exlusiva responsabilidad que la máquina

Type : TR1

come descritta nella documentazione allegata e nei nostri archivi, è in conformità con le direttive 89/392 e relative modifiche 91/368, 93/44, 93/68, alla direttiva 73/23 e relativa modifica 93/68, alla direttiva 89/336 e relative modifiche 92/31, 93/68, alle norme europee EN292/1, EN292/2, prEN1050, EN60204-1, EN50081-1, EN50082-1, EN60034-1. Questa macchina non può essere messa in servizio prima che la macchina in cui sarà assemblata, sia stata dichiarata conforme alle disposizioni della direttiva macchine 89/392/CEE.	as described in the attached documentation and in our files, is in conformity with the 89/392 directive modified by 91/368, 93/44 and 93/68 directives, with 73/23 directive modified by 93/68, with 89/336 directive modified by 92/31 and 93/68, with EN292/1, EN292/2, prEN1050, EN60204-1, EN50081-1, EN50082-1, EN60034-1 european normes. This machine must not be put into service until the machine in which it is intented to be incorporeted into, has been declared in conformity with provisions of 89/392/CEE directives.	comme decrite dans la documentation jointe et dans nos archives, est en conformité avec la directive 89/392 et aux modifications 91/368, 93/44, 93/68, à la directive 73/23 et modification 93/68, à la directive 89/336 et aux modifications 92/31 et 93/68, et aux normes européenes EN292/1, EN292/2, prEN1050, EN60204-1, EN50081-1, EN50082-1, EN60034-1. L'utilisation de l'alternateur n'est pas autorisée avant que l'ensamble alternateur et systeme d'entrainement, soit déclaré conforme aux dispositions de la directive 89/392/CEE.	wie in den anliegenden Unterlagen und in unserer Dokumentation beschrieben konform ist mit den Richtlinien 89/392, jedoch modifiziert nach 91/368, 93/44, 93/68, mit Anweisungen 73/23 modifierzt nach Änderung 93/68, mit Änderung 89/336 modifierzt nach Änderung 92/31 und 93/68 und mit den Europäischen Vorschriften EN292/1, EN292/2, prEN1050, EN60204-1, EN50081-1, EN50082-1 und EN60034-1. Der Betrieb der o.g. Maschine nach dem Zusammenbau darf nur dann erfolgen, wenn die Vorschriften der Maschinenrichtlinien 89/392/EWG eingehalten werden.	como descripta en la documentación adjunta y en nuestros archivos es conforme con la directiva màquinas 89/392 y modificas relativas 91/368, 93/44, 93/68, con la directiva 73/23 y modificas relativas 93/68, con la directiva 89/336 y modificas relativas 92/31, 93/68, a los normas europeas EN292-1, EN292-2, prEN1050, EN60204-1, EN50081-1, EN50082-1 y EN60034-1. Esta màquina no puede ser puesta en servicio antes que la màquina resultante, con la cual serà acoplada, sea declarada conforme con los disposiciones de la directiva màquina 89/392/CEE.

Ragione sociale/Legal name/Raison sociale/Firmenname/Nombre legal
Indirizzo sede/Headoffice address/Adresse du siege/Hauptsitz/Dirección
Codice fiscale/Fiscal code/Numero R.C./Steuernummer/Codigo fiscal
Partita IVA/VAT Reg.Number/NumeroTVA/USTID-Nr./Número de IVA
Numero di telefono/Telephone number/Numero de telephone/Telephonnummer/Teléfono
Numero di fax/Fax number/Numero de fax/Faxnummer/Número de fax
E-Mail

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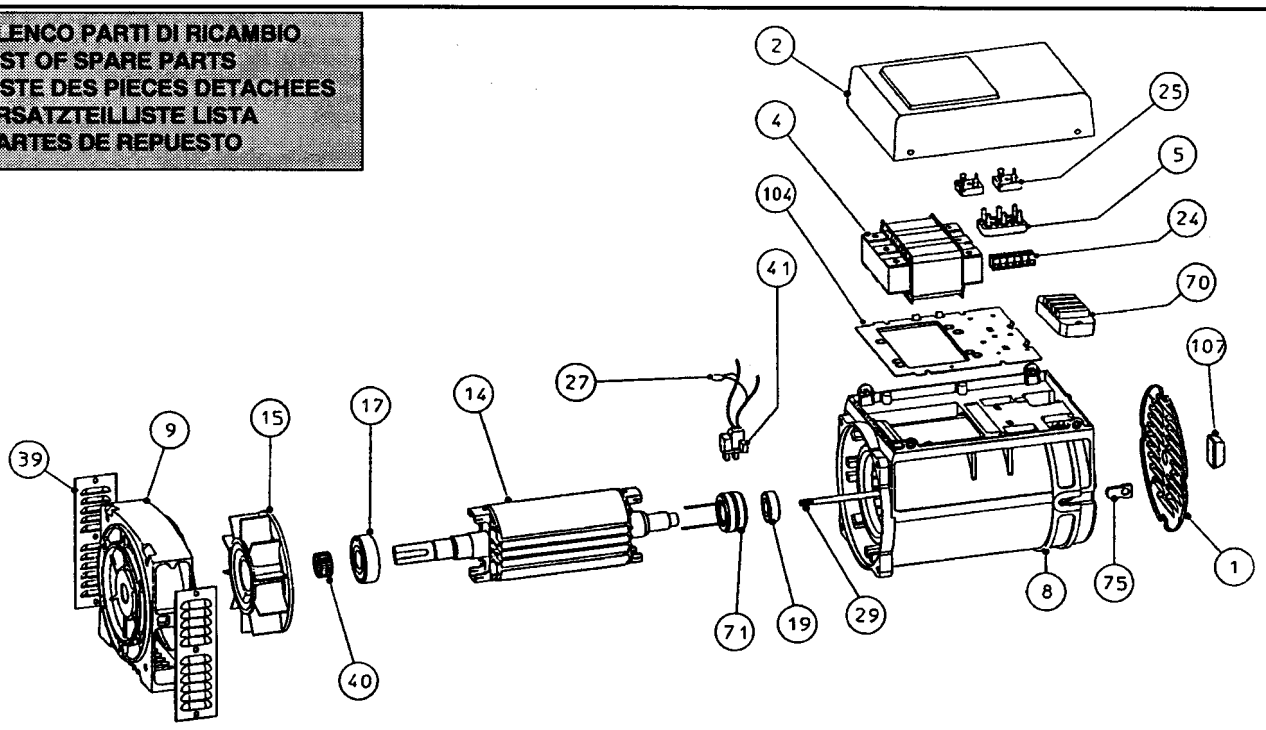
Via Roma, 20 - 36051 Creazzo (VI) Italy
01267440244
01267440244
0444 - 396111
0444 - 396166
mecc-alte-spa@meccalte.it

Firma / Signature / Signature / Unterschrift / Firma
mecc alte spa
RESPONSABILE UFF. TECNICO
p.a. Mino Zarbato

ELENCO PARTI DI RICAMBIO
LIST OF SPARE PARTS
LISTE DES PIECES DETACHEES
ERSATZTEILLISTE LISTA
PARTES DE REPUESTO



N°	DENOMINAZIONE	NAME	DESIGNATION	NAMEN	DENOMINACION	CODE
1	GRIGLIA	GRID	GRILLE DE FERMETURE	ZULUFTGITTER	REJILLA	0390700010
2	CUFFIA	TERMINAL BOX LID	COUVERCLE	KLEMMENKASTENDECKEL	TAPA	0390501015
4	TRASFORMATORE	REGULATING TRANSFORMER	TRANSFORMATEUR DE COMPOUNDAGE	COMPOUND TRANSFORMATOR	TRANSFORMADOR COMPOUND	***
5	MORSETTIERA UTILIZZAZIONE	TERMINAL BOARD	PLANCHETTE A BORNES	KLEMMENBRETT	PLACA BORNES TERMINAL	0391100101
6	CARCASSA CON STATORE	FRAME AND STATOR	CARCASSE AVEC STATOR	GEHÄUSE MIT STATOR	CARCASA CON ESTATOR	***
8	COPERCHIO ANTERIORE B9	DRIVE END BRACKET B9	FLASQUE AVANT B9	VORDERES GEHAUSE B9	TAPA ANTERIOR B9	***
9	COPERCHIO ANTERIORE B14	DRIVE END BRACKET B14	FLASQUE AVANT B14	VORDERES GEHAUSE B14	TAPA ANTERIOR B14	0391700116
14	INDUTTORE ROTANTE	ROTOR ASSY	ROUE POLAIRE	ROTOR	INDUCTOR ROTANTE	***
15	VENTOLA	FAN	VENTILATEUR	LÜFTERRAD	VENTILADOR	0392000027
17	CUSCINETTO ANTERIORE 6205-2RS	FRONT BEARING 6205-2RS	ROULEMENT AVANT 6205-2RS	VORDERES LAGER 6205-2RS	COJINETE ANTERIOR 6205-2RS	0390302511
19	CUSCINETTO POSTERIORE 6203-2Z-C3	REAR BEARING 6203-2Z-C3	ROULEMENT ARRIERE 6203-2Z-C3	HINTERES LAGER 6203-2Z-C3	COJINETE POSTERIOR 6203-2Z-C3	0390302521
24	MORSETTIERA AUSILIARIA	AUXILIARY TERMINAL BOARD	BORNES AUXILIARES	NEBEN-KLEMBRETT	REGLETA	0391100110
25	PONTE RADDRIZZATORE MONOFASE	RECTIFYNG 1 PHASE BRIDGE	PONT REDRESSEUR MONOPHASE	BRUCKENGLEICHRICHTER EINPHASIG	PUENTE RECTIFICADOR	0391400607
27	VARISTORE	VARISTOR	VARISTOR	VARISTOR	VARISTOR	0392000256
29	TIRANTE CENTRALE	SECURING STUD	TIGE CENTRAL	ZENTRIESSTIFT	TIRANTE CENTRAL	***
39	RETINA PROTEZIONE	PROTECTION SCREEN	GRILLE DE PROTECTION	SCHÜTZGITTER	REJILLA DE PROTECCION	0390700009
40	ANELLO COMPENSATORE	FIXING RING	RONDELLE DE BLOQUAGE	COMPENSATOR RING	ANILLO COMPENSADORES	0390100210
41	GRUPPO SPAZZOLE COMPLETO	BRUSH GEAR ASSEMBLY	ENSEMBLE PORTE BALAIS COMPLET	BÜRSTENHALTER	PORTAESCOBILLAS	0390700061
71	COLLETTORE AD ANELLI	SLIP RING	BAGUES	BÜRSTENRING	COLECTOR DE ANILLOS	0390302351
75	GOMMINO	RUBBER CUP	CAPOUCHON DE FERMATURE EN PLASTIQUE	SCHLUSSGUMMI	GOMA DE CIERRE	0390700306
95	PANNELLO SENZA PRESE	BOX-PANEL WITHOUT SOCKETS	PANNEAU SANS PRISES	SEITENBLECHOHNE STECKDOSEN	TABLERO SIN TOMAS	***
104	PANNELLO PORTA COMPONENTI	COMPONENT HOLDING PANEL	PANNEAU PORT COMPOSANTS	KOMPONENTENBLECHTAFEL	PANEL PORTACOMPONENTS	0390302841
107	TAPPO PER GRIGLIA	GRID RUBBER CAP	OBTURATEUR POUR GRILLE DE FERMETURE	GUMMISTOPFEN	GOMA PARA REJILLA	0391802006

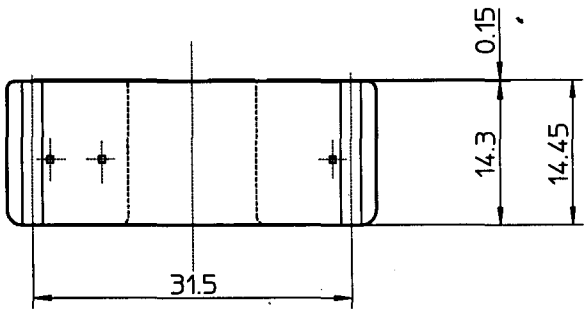
Nella richiesta di pezzi di ricambio specificare il tipo e il codice dell'alternatore / When requesting spare parts always indicate the alternator's type and code / Pour toute demande de pieces detachées, prière de mentionner le type et le code de l'alternateur / Bei Ersatzteilbestellung bitte immer die Teilbenennung den Typ und den code des Wechselstromgenerators angeben / En cada pedido de pizas de recambio especificar siembre el tipo y el codigo del alternador

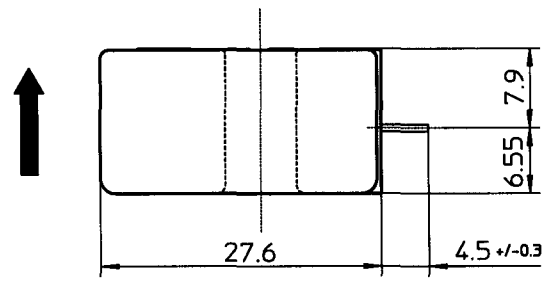
Notes : [1] Maximum measuring range at +85°C
[2] The result of the coercive field of the magnetic circuit.

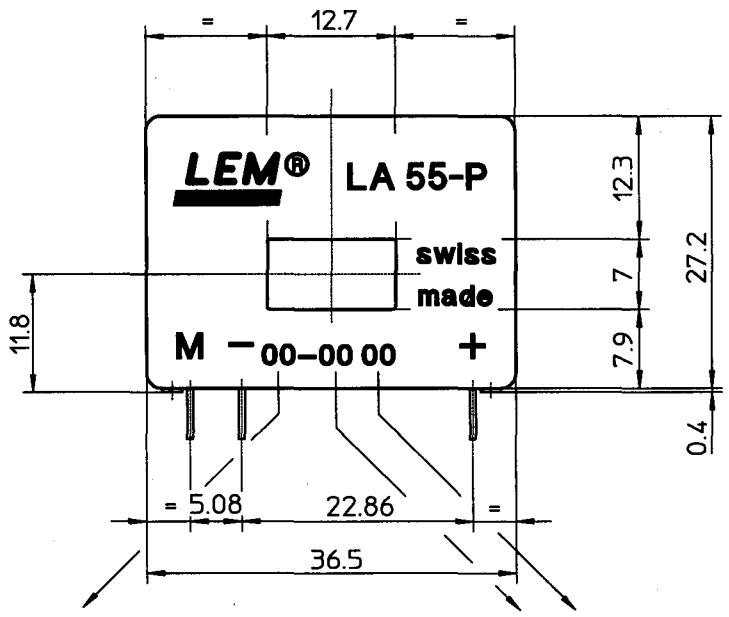
Remarks :
- The temperature of the primary conductor should not exceed 90°C.
- This is a standard model; for different versions (e.g. supply voltages, turns ratio, unidirectional measurements, etc.), please contact us.
- Dynamic performance (di/dt and response time) is best with a single bar completely filling the primary hole.
- In order to achieve the best magnetic coupling, the primary windings have to pass over the top side of the device.

Dimensions LA 55-P

General tolerance ± 0.2 mm
Recommended PCB hole dia. : 0.9 mm







Standard 00
or N° SP..

Year Week
Date Code

Secondary terminals :

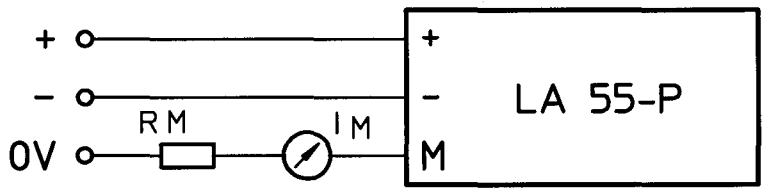
Terminal + : supply voltage + 12 to 15 V
Terminal - : supply voltage - 12 to 15 V
Terminal M : measure

DENVER TECHNICAL PRODUCTS (PTY) LTD
P.O. Box 75810, Garden View 2047
Tel. (011) 626-2023
Fax (011) 626-2009

Emergency Tel. 082 443 0680

PLEASE VISIT OUR WEBSITE:
http://www.denvertech.co.za
OUR E-MAIL ADDRESS IS:
denvertech@pixie.co.za

Connection :



«This data sheet is a translation of the French version which is deemed authentic.»
We reserve the right to carry out modifications on our transducers, in order to improve them, without previous notice.

LA 55-P

Definition

The «LA 55-P» is a current transducer for the electronic measurement of currents : DC, AC, IMPL., etc., with galvanic isolation between the primary (high power) and the secondary (electronic) circuits.

Electrical data

Nominal current I_N		**: 50 A rms**				
Measuring range		**: 0 to ± 70 A**				
		at +70°C			**at +85°C**	
Measuring resistance		**: R_M min.**	**R_M max.**		**R_M min.**	**R_M max.**
with ± 12 V	**at ± 50 A max.**	**: 10 ohm**	**100 ohm**		**60 ohm**	**95 ohm**
	at ± 70 A max.	**: 10 ohm**	**50 ohm**	**(1) at ± 60 A max.)**	**60 ohm**	**60 ohm**
with ± 15 V	**at ± 50 A max.**	**: 50 ohm**	**160 ohm**		**135 ohm**	**155 ohm**
	at ± 70 A max.	**: 50 ohm**	**90 ohm**	**(1) at ± 55 A max.)**	**135 ohm**	**135 ohm**
Nominal analog output current		**: 50 mA**				
Turns ratio		**: 1 : 1000**				
Accuracy at +25°C and at ± 15 V (± 5 %)		**: ± 0.65 % of I_N**				
Accuracy at +25°C and at ± 12 to ± 15 V		**: ± 0.9 % of I_N**				
Supply voltage		**: + and - 12 to 15 V (± 5 %)**				
Isolation		**: between primary and secondary : 2.5 kV rms/50 Hz/1 min.**				

Accuracy - Dynamic performance

Zero offset current at +25°C	: max.	± 0.2 mA	
Residual current [2]			
after an overload of 3 x I_N	: max.	± 0.3 mA	
Thermal drift of offset current			
(between 0°C and +70°C)	: typical	± 0.1 mA	max. ± 0.5 mA
(between -25°C and +85°C)	: typical	± 0.1 mA	max. ± 0.6 mA
Linearity	: better than 0.15 %		
Response time	: inferior at 500 nS		
Rise time	: better than 1 µs		
di/dt accurately followed	: better than 200 A/µs		
Bandwidth	: 0 to 200 kHz (-1dB)		

General data

Operating temperature	: -25°C to +85°C
Storage temperature	: -40°C to +90°C
Current consumption	: 10 mA (at ± 15 V) + output current
Secondary internal resistance	: 80 ohm (at +70°C), 85 ohm (at +85°C)
Package	: insulated plastic case qualified according to UL 94-V0
Weight	: 18 g.
Fastening	: for mounting on printed circuit board by 3 pins 0.63 x 0.56 mm, recommended hole size 0.9 mm dia.
Connection to primary circuit	: through-hole 12.7 x 7 mm
secondary circuit	: on 3 pins 0.63 x 0.56 mm
Polarity markings	: a positive measuring current is obtained on terminal M, when the primary current flows in the direction of the arrow.
EMC 951220/4	: qualified according to IEC 801.3

LEM SA

CASE POSTALE 785
CH-1212 GRAND-LANCY 1
GENEVA, SWITZERLAND

CHEMIN DES AULX 8
CH-1228 PLAN-LES-OUATES
GENEVA, SWITZERLAND

TEL: 022/ 706 11 11
FAX: 022/ 794 94 78