

# ALTER

**ALTER ELETTRONICA S.R.L.  
CASALE MONFERRATO (ITALY)**

**4 QUADRANT**

**BRUSHLESS DRIVE**

**SERIES PWM**

**MODEL**

# BTD

## TECNICAL FEATURES

- Panel board fitting. IP20 Protection rating.
- Operating temperature: 0 to +65°C. (32 to 149°F).
- Storage temperature: -10 to +70°C (14 to 158°F).
- Relative humidity 95% max. without condensate.
- Maximum altitude: 1000 m. (3280 feet) a.s.l.
- Auxiliary supply:  
Single-phase 220V  $\pm 10\%$  - 50mA max. (protected by external fuses 250V-500mA).
- Power supply:  
Three-phase 50V to 240V (protected by external fuses as TABLE 1).
- Supply frequency: 45 to 65Hz.
- Max. output voltage: 1.2 X Three-phase input voltage.
- Max. output current: as TABLE 1.
- Max. input Three-phase supply current: .75 X output current.
- Max. power dissipation: 5 X output rated current.
- Thermal time constant: 15'.
- Continuous power of clamp circuit: 160 W.
- External clamp resistance (OPTIONAL).
- Insulation between power and control circuits.
- Input over voltage built-in protections.
- Switching frequency: 16KHz.
- Min. load inductance: 1mH.
- Connections: Power to terminal board, Signals to connector.
- Brushless Motor must be equipped with one of the following devices:
  - Brushless Tachogenerator and Hall effect sensors.
  - Special encoder designed for Brushless Motor (SV line driver).
  - Resolver (2 poles).
- Encoder Simulated output (resolver type only).  
1024 Lines for each channel, 5V line driver (other lines are OPTIONALS).
- Encoder outputs: A, B, Z (encoder type only).
- Speed reference differential input stage.  
Differential and common mode max. input voltage: 10V. Input resistance: 100K $\Omega$ .
- Adjustable and cutting out acc./ dec. ramp (ramp time .15 to 1.5sec).
- Current limit reference input:  
+10V max. (circuit diagram at page 9).
- Speed monitor output:  
 $\pm 10$ V max. - output resistance 1K $\Omega$ .
- Current monitor output:  
 $\pm 5$ V max. - output resistance 1K $\Omega$ .
- Outputs: +24V - 50mA max., +10V and -10V - 5mA max.
- Optocoupled logic controls: 15 to 30Vdc - 10mA max.
- Led DISPLAY for status and faults monitoring.
- Drive OFF in case of the following faults:
  - Auxiliary supply fault
  - Three-phase Power supply fault.
  - Bus Overvoltage.
  - Motor connections fault.
  - Overtemperature.
  - Motor overload.
  - Motor overcurrent.
  - Position or speed feedback fault.
  - Clamp overload.
- Reset input f or faults.
- DRIVE OK output contact (breaking capacity: 110Vac / 24Vdc - 50mA max).

DRIVE		THREE-PHASE SUPPLY FUSES [A]	CABLE SQUARE MEASURE	
SIZE (**)	CURRENT (*) RATED /PEAK [A]		THREE-PHASE SUPPLY [mm <sup>2</sup> ]	MOTOR [mm <sup>2</sup> ]
1	6 / 12	6	2,5	2,5
1	10 / 20	10	2,5	4
1	15 / 30	16	2,5	4
2	20 / 40	20	6	10
2	30 / 60	32	10	16
2	40 / 80	40	10	16
2	50 / 100	50	10	16
2	60 / 120	63	10	16
(*)	With operating temperature 0°C to +40°C. (32 to 104°F) Derating: 4% every °C with operating temperature above +40°C.(104°F)			
	Running time at peak current: 2sec.			
(**)	Outline dimension at page 8			

TABLE. 1

#### OTHER CABLE SQUARE MEASURE:

- External clamp resistance: 2.5 mm<sup>2</sup>
- Auxiliary supply: 1.5 mm<sup>2</sup>
- CN1 and CN4 connectors: 1.5 mm max.
- CN2 and CN4 connectors: .5 mm<sup>2</sup>

#### INSTALLATION AND WIRING

- Accurately check that the drive underwent no damage while the transport.
- Standing installation and enough room for a good air circulation.
- Don't place side by side the size 1 drives but with more than 20mm air gap.
- Make use of galvanized sheet iron connected to ground.
- Connect to a good ground the terminal located on the right side of the terminal board.
- Accurately check that the connections corresponds to that indicated in this instruction book.
- Make use of shielded cable for both signal and power connections.
- Connect to ground the shield ends of some shielded cable.
- Don't make use of terminal board to connect shielded cables but shielded connectors only.
- Spikes suppressors (RC snubber for ac supply and diodes for dc) must be mounted in parallel to the coils of: remote control switches, relays, solenoid valves, clutches, brakes, and single or three-phase ac motors.

## SETTING AT WORK

### NOTE:

- **The common (0V) of all internal supply Is connected to the frame.**
- **The negative probe of the voltmeter and the oscilloscope ground must be connected to the test point T.P. indicated by “GND” or to the frame.**
- **Make use of totally insulated screwdriver for the trimmer’s regulation.**

Accurately check that:

- Single-phase auxiliary voltage supply be:  $220V_{ac} \pm 10\%$ .
- Three-phase voltage supply be sufficient to supply the motor and included within the rating limits of the drive.

Carry out the following settings:

- Select the voltage range of the brushless tachogenerator or the max. speed for resolver or encoder (see at page 7).
- Enable or disable the acc./dec. ramp. (see at page 7).
- Set the “SPEED” trimmer to the counterclockwise limit.
- Switch on both single-phase and three-phase supply and check that the led “AUX SUPPLY” Is lighted.
- Set on the T.P. ‘CURRENT’ by the trimmer “CURRENT” the voltage correspondent to the motor peak current (see at page 5).
- Enable the drive by the “COEN” control.
- Set the max. speed reference to the drive and adjust by the “SPEED” trimmer the max. working speed of the motor.  
If the motor shaft rotation Is in opposite direction to that correct, reverse the sign or the links of the speed reference (REFH - REFL). If the “FEEDBACK FAULT” led Is lighted see at page 4.
- Adjust by the ‘GAIN’ trimmer the quickness of motor answer.
- Adjust the ‘OFFSET’ trimmer to stop the slow rotation of the motor shaft with zero speed reference.
- Adjust by the RAMP” trimmer the motor acc./dec. time (see at page 4).
- If some of the RED led is lighted see at page 4.

### START SEQUENCE

- Switch on the single-phase auxiliary supply.
- Switch on the three-phase power supply.
- Enable the drive by the “COEN” control.
- Supply the speed reference.

### STOP SEQUENCE

- Remove the speed reference.
- Disable the drive by the “COEN” control.
- Switch off the three-phase power supply.
- Switch off the single-phase auxiliary supply.

## FAULT LED's (RED)

The led lighted correspond to the drive fault.

<b>UNDERVOLTAGE</b>	Three-phase supply is too lows or switched off.
<b>FEEDBACK FAULT</b>	Speed and/or position device fault (STORED WARNING). With this fault please check: <ul style="list-style-type: none"><li>- Motor to drive connections. (see at pages 11—12—13).</li></ul>
<b>MOTOR OVERLOAD</b>	Exceeding the settled rated current in the motor. (STORED WARNING). With this fault please check: <ul style="list-style-type: none"><li>- MOTOR load.</li><li>- MOTOR winding and connections. (see at pages 11—12—13)</li></ul>
<b>OVER CURRENT</b>	Exceeding the settled peak current in the motor. (STORED WARNING). With this fault please check: <ul style="list-style-type: none"><li>- MOTOR winding and connection cables.</li></ul>
<b>CLAMP OVERLOAD</b>	Exceeding max. working time of clamp circuit (1.5 sec). (STORED WARNING). With this fault please check: <ul style="list-style-type: none"><li>- The frequency and the time of the motor stop cycles.</li><li>- Three-phase voltage supply higher than rating limits.</li><li>- Flickering of the motor speed produced by:<ul style="list-style-type: none"><li>Some faults on the speed or position feedback.</li><li>Speed reference flickering.</li></ul></li></ul>
<b>OVER TEMPERATURE</b>	Drive overtemperature. (STORED WARNING). With this fault please check: <ul style="list-style-type: none"><li>- The inner temperature of the box.</li></ul>
NOTE:	The reset of the STORED WARNINGS is possible by the control RESET” or switching off the auxiliary single-phase supply.

## SIGNALING LED's (GREEN)

<b>AUX SUPPLY</b>	If this led is lighted all the supplies are OK. If this led is not lighted please check: <ul style="list-style-type: none"><li>- Single-phase auxiliary supply 220Vac <math>\pm 10\%</math>.</li><li>- Output +24Vdc shorted to ground.</li></ul>
<b>COEN</b>	If this led is lighted the external enable control Is ON. If this led is not lighted the motor shaft is idle.
NOTE:	The drive control the motor only when all the following conditions are satisfied: <ul style="list-style-type: none"><li>- Green leds AUX SUPPLY and COEN are lighted.</li><li>- All red leds are not lighted.</li></ul>

## TEST POINTS (T.P.)

<b>REF</b>	Speed reference.
<b>CURRENT</b>	Voltage reference correspondent to the settled peak current in the motor (adjusting by 'CURRENT' trimmer). (10V on this T. P. correspond to the peak current of the drive) (The rated current in the motor is predetermined at 50% of the settled peak current).
<b>GND</b>	Common (0V) of all internal supplies. (connected to the frame).

## REGULATION TRIMMERS

<b>OFFSET</b>	Zero setting of the speed offset.
---------------	-----------------------------------

NOTE: The clockwise rotation of the regulation screw of the following trimmers increase the adjusted value.

<b>CURRENT</b>	Peak Current in the motor. (The settled value is available on T.P. "CURRENT").
<b>SPEED</b>	Motor speed.
<b>GAIN</b>	Quickness of motor answer to the variations of the speed reference and of the motor load. The excess on the regulation bring to shaft vibrations.
<b>RAMP</b>	Setting of the acc./dec. time of the motor. Enable: SW3 settled ON - SW4 settled OFF (see at page 7). Time range: .15 to 1.5 sec. (with speed reference 10V). If the max. speed reference is less than 10V the time is correspondent shortest.

## ENCODER / ENCODER SIMULATED OUTPUT

On the connector CN2 are available the channels A, B, Z of the ENCODER built in the motor or the same channels of the ENCODER SIMULATED obtained by the resolver (see at page 10).

For the ENCODER SIMULATED output are available 1024 lines for each channel. Others number of lines are OPTIONAL.

The above signals are TTL differential outputs from AM26LS31 line driver.

## INPUT / OUTPUT LOGIC CONNECTIONS

<b>OKD 1-2</b>	(CN4/4 - CN4/5) Relay contact which Is closed when the driver is regularly working (NO WARNING). (Breaking capacity: 110Vac / 24Vdc - 50mA max). The contact is closed also if the Three-phase supply Is too low or switched off (UNDERVOLTAGE led is lighted) but the external enable control (COEN) is OFF.
<b>LOCO</b>	(CN4/10) Common of the logic controls.
<b>COEN</b>	(CN4/2) Converter enable. (Control voltage: 15 to 30Vdc - 10mA max).
<b>RESET</b>	(CN4/3) Reset of the STORED WARNINGS. The reset happen during the rise slope of the control. (Control voltage: 15 to 30Vdc - 10mA max).

## INPUT / OUTPUT ANALOG CONNECTIONS

<b>REFL</b>	(CN1/2) Cold input of the speed reference.
<b>REFH</b>	(CN1/3) Hot input of the speed reference. 10V max. input voltage between: REFH and GND, REFL and GND, REFH and REFL. Input resistance 100K $\Omega$ .
<b>SPMO</b>	(CN1/6) Output voltage correspondent to the motor speed. $\pm 10V$ max. Output resistance 1K $\Omega$ .
<b>CUMO</b>	(CN1/7) Output voltage correspondent to the motor current. $\pm 5V$ correspond to peak output current of the drive. Output resistance 1K $\Omega$ .
<b>EXCL</b>	(CN1/8) Input of the external current limit reference. +10V correspond to peak current of the drive. Circuit diagram at page 9.

## SUPPLY OUTPUTS

<b>+24V</b>	External logic control supply (24Vdc 50mA max).
<b>+10V</b>	+10V - 5 mA max output.
<b>-10V</b>	-10V - 5 mA max output.
<b>GND</b>	(CN1/1 - CN1/4 - CN1/8 - CN1/9) Common (0V) of all internal supplies (connected to the frame).

## DRIVE TO MOTOR CONNECTIONS

Feedback and motor connections must be wired according with the diagrams inserted on pages 11—12—13 of this instruction book.

If the Brushless Motor type is not of that scheduled in this instruction book please contact our technical department.

## BRUSHLESS TACHOGENERATOR VOLTAGE SELECTION

To set the drive according to the brushless tachogenerator voltage output is necessary:

- To calculate the X parameter by the formula:  
Kdt = tachogenerator voltage gradient (readed on tachogenerator) [V/rot].  
 $\omega$  = max. motor speed [RPM].  
Vref = max. speed reference.
- Select by SW1 and SW2 the value upper that calculated according with the following table:

$$X = \frac{Kdt \cdot \omega \cdot 8}{Vref}$$

X	0 ÷ 16	17 ÷ 40	41 ÷ 56	57 ÷ 80
SW1	OFF	ON	OFF	ON
SW2	OFF	OFF	ON	ON

## ENCODER TTL SETUP

To set the drive according to the encoder mounted on the motor, is necessary:

- To calculate the X parameter by the formula:  
PPR = number of Pulse For Rotation of the encoder [PPR].  
 $\omega$  = max. motor speed. [RPM].  
Vref = max. speed reference.
- Select by SW1 and SW2 the value upper that calculated according with the following table:

$$X = \frac{PPR \cdot \omega \cdot 8}{Vref \cdot 3000}$$

X	0 ÷ 1024	1025 ÷ 2048	2049 ÷ 4096	4097 ÷ 8192
SW1	ON	OFF	ON	OFF
SW2	ON	ON	OFF	OFF

## ENCODER FANUC SETUP

SW1 is disabled in this case.

SW2 = OFF for motor with encoder 2500 [PPR]

SW2 = ON for motor with encoder 10000 [PPR]

## SPEED RANGE SELECTION (RESOLVER ONLY)

SW1 = OFF for motor speed lower that 3000 [RPM].

SW1 = ON for motor speed lower that 6000 [RPM].

SW2 is disabled in this case.

## RAMP ENABLE / DISABLE

RAMP	ENABLE	DISABLE
SW3	ON	OFF
SW4	OFF	ON

NOTE: If the switches are otherwise settled the circuit have operation faults.

## ELETTROMAGNETIC COMPATIBILITY

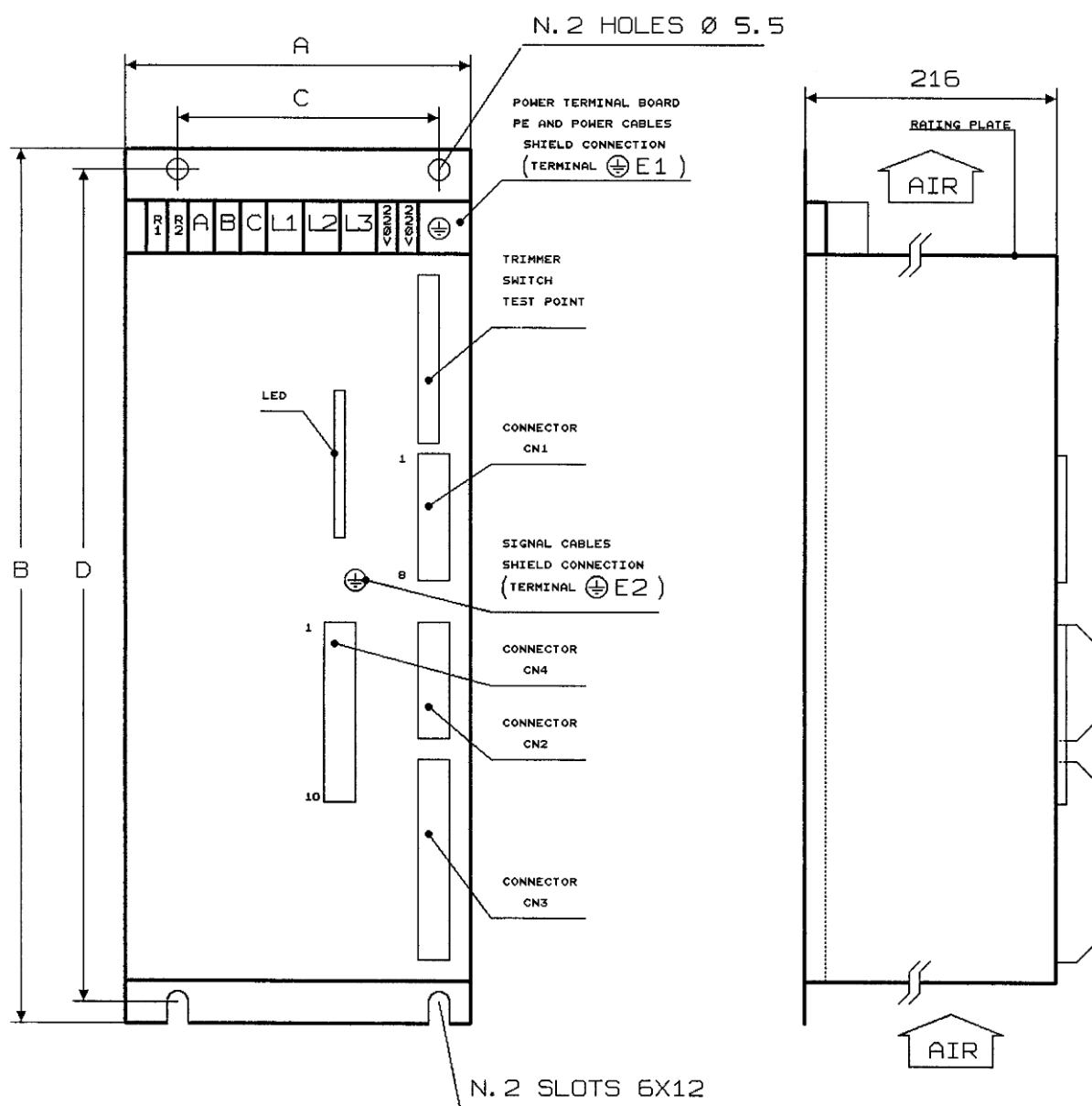
About this subject please consult the instruction book 91/089.

**ALTER ELETTRONICA INDUSTRIALE S.r.l. has no responsibility for imprecision or mistakes included in this book.**

**The contents of this book are subject to modifications without notice.**



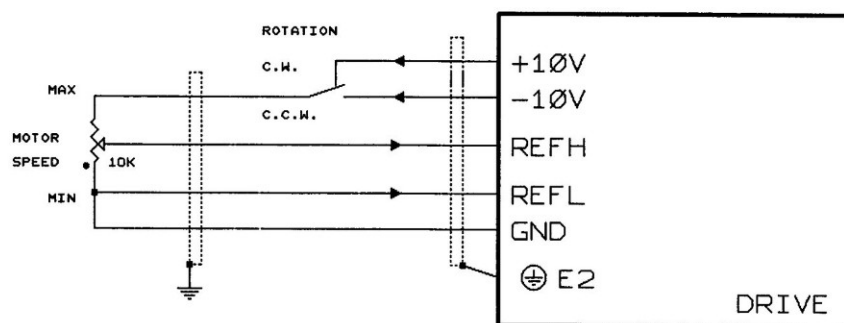
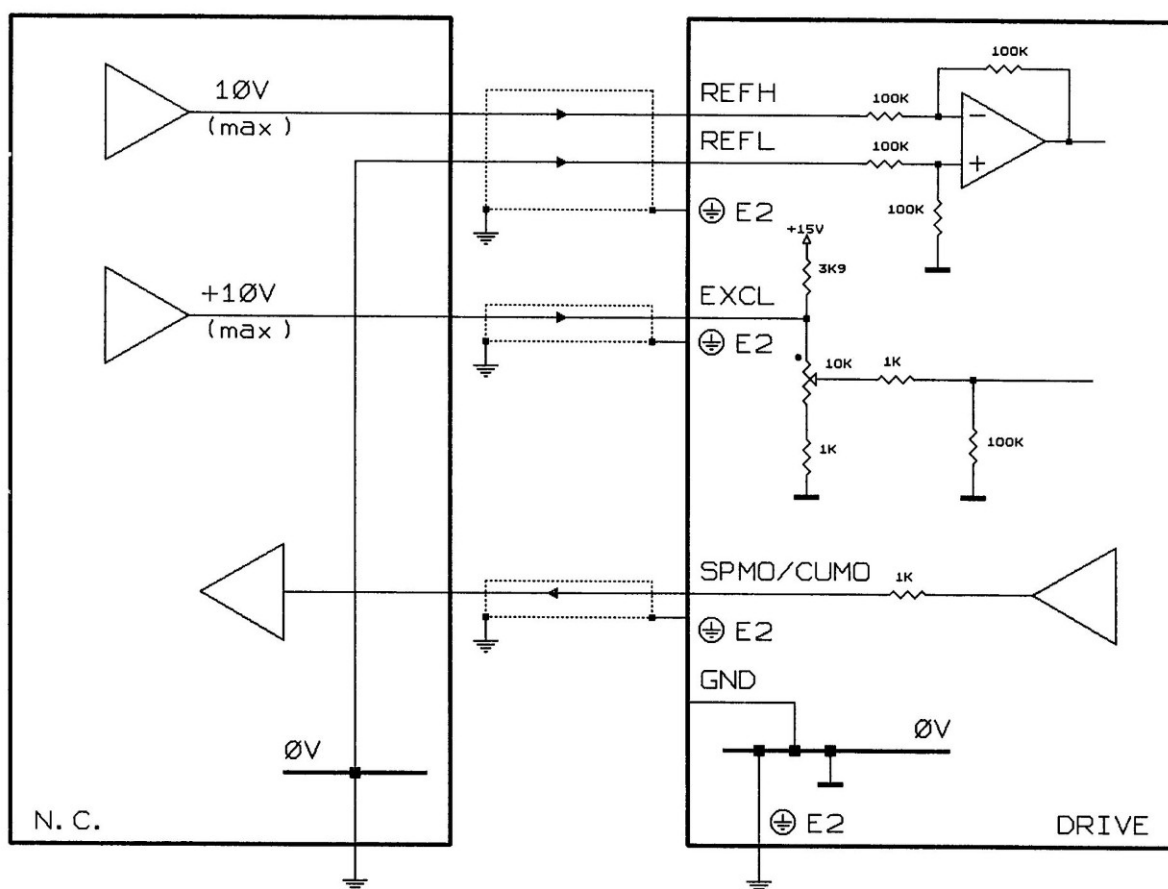
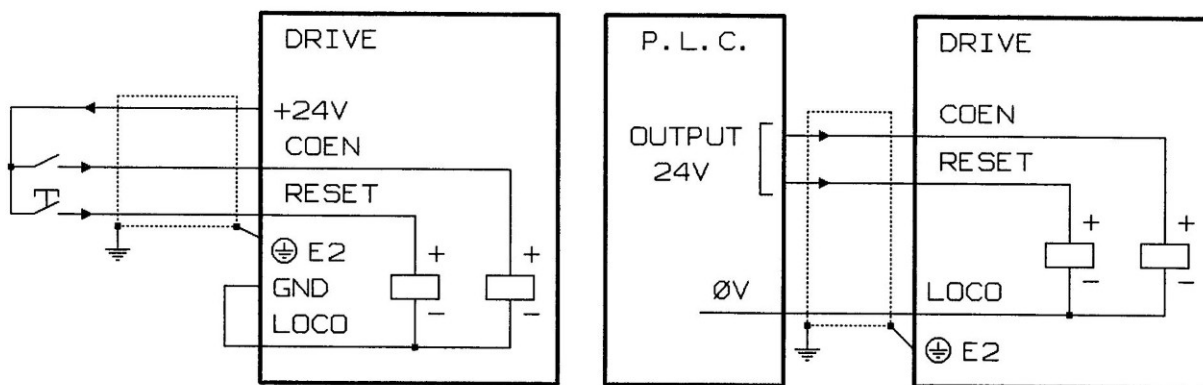
## OUTLINE DIMENSIONS



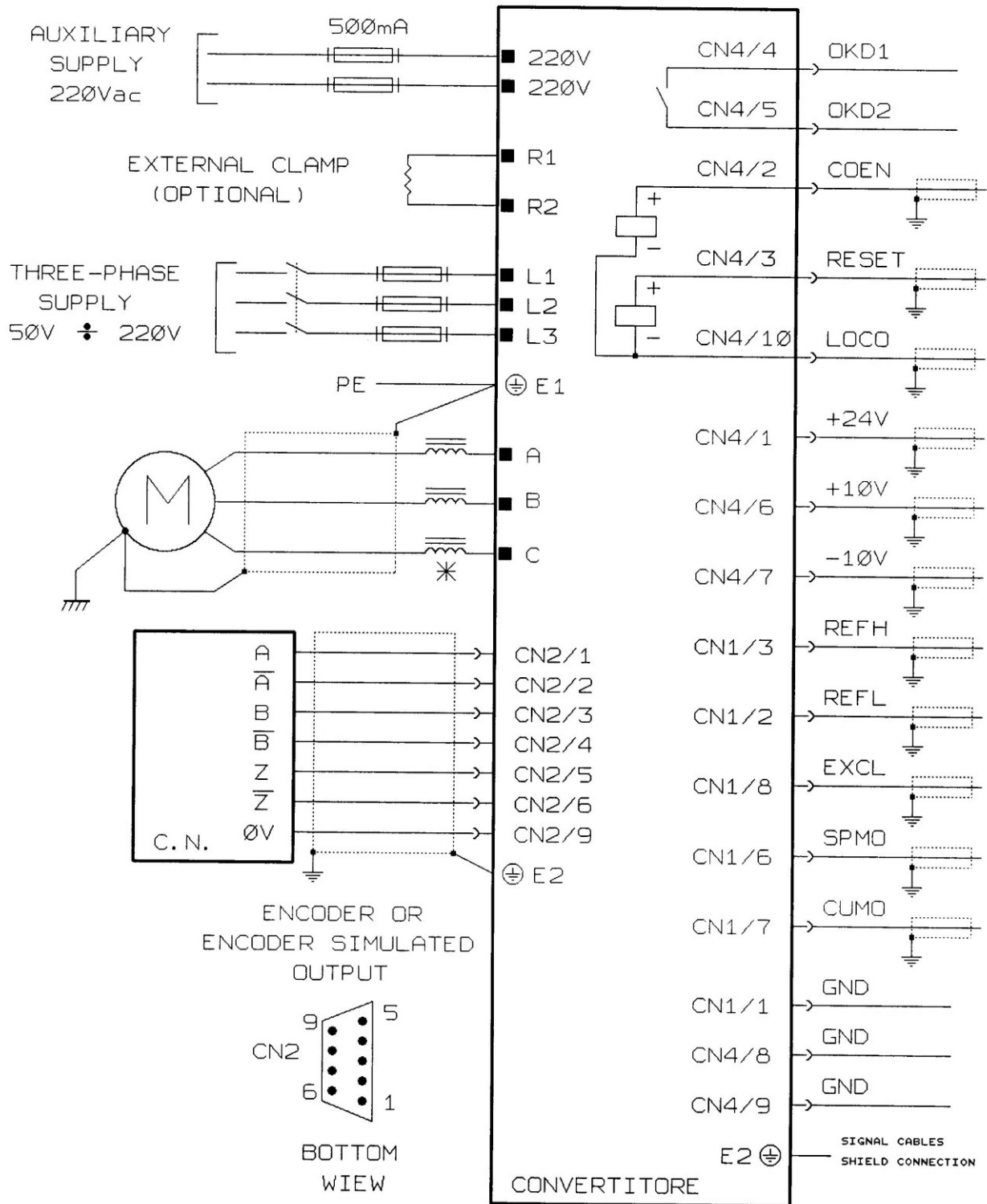
DIMENSIONS [mm]

SIZE	A	B	C	D	WEIGHT
1	95	310	72	297	4,5 Kg
2	150	383	110	370	8,5 Kg

## CONNECTIONS EXAMPLES



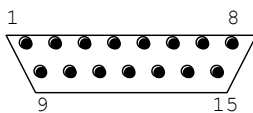
## OUTSIDE CONNECTIONS



\* ONLY WITH MOTOR INDUCTANCE BELOW 1mH

## MOTOR TO DRIVE CONNECTIONS

### BRUSHLESS MOTORS EQUIPPED WITH BRUSHLESS TACHOGENERATOR AND HALL EFFECT POSITION SENSOR

MOTOR MODEL		CONNECTIONS MOTOR SIDE											
TYPE	HALL SECT.	MOTOR CABLE			FEEDBACK CABLE								
					BRUSHLESS TACHOGENERATOR								
A.B.B. (Isoflux) series 64 e 74	120°	C	G	F	G	H	F	I	B	E	D	C	A
BAUMULLER series SM	120°	V	W	U	10	11	9	8	2-4-6	7	5	3	1-12
BAUMULLER series DS56-DS71-DS100	120°	U	V	W	9	10	7	6-8-11	2	5	3	4	1
DRIVE SYSTEM series BLT	120°	1	2	3	B	K	A	J	D	N	W	Z	M
LAFERT-SELCA series T (old)	120°	W	V	U	GW	GV	GU	GØ	Vcc	SU	SV	SW	VØ
LAFERT-SELCA series T (old)	120°	4	3	2	12	11	7	6	4	1	2	3	5
LAFERT-SELCA series T (new)	120°	C	B	A	12	11	7	6	4	1	2	3	5
LAFERT-SELCA series T (new)	120°	W	V	U	12	11	7	6	4	1	2	3	5
SEIDEL KOLLMORGEN series SM	120°	V	W	U	10	11	9	8	2-4-6	7	5	3	1-12
SIEMENS series FT1 e FT5	120°	4	3	2	12	11	7	6	4	1	2	3	5
SIEMENS series FT1 e FT5	120°	W	V	U	12	11	7	6	4	1	2	3	5
Signal name		U	V	W	TC2	TC1	TC3	ØV	+15V	SE3	SE2	SE1	ØV
		A	B	C	7	8	6	14	2	3	4	5	15
		TERMINALS			CONNECTOR CN3 (pin)								
													
					MOVABLE FEMALE CONNECTOR (VIEW SOLDER SIDE)								
		CONVERTER SIDE CONNECTIONS											

#### NOTE:

The motors indicated in the table are compatible with converters MODEL: BTD1-T0-000-220-XXX, FW: TACH 0A

The MODEL and the FIRMWARE (FW) are indicated on the nameplate of the converter .

For other motors (with transducer of the same type), contact the technical service ALTER.

#### CONNECTION OF THE SCREENS

1. Connect to the terminal E1 of the converter to the screens of the power cables (three-phase power supply and motor).
2. Connect the shields of the power cable and transducer cable to the ground terminal of the motor (or to the casing).
3. Connect the cable's shield of the signal (Speed reference and motor transducer) to the E2 terminal.

## MOTOR TO DRIVE CONNECTIONS

**INDRAMAT BRUSHLESS MOTORS with D.C. TACHOGENERATOR and POSITION SENSORS**  
(For specific drive only)

MOTOR MODEL		CONNECTIONS MOTOR SIDE										
TYPE	HALL SECT.	MOTOR CABLE			FEEDBACK CABLE							
					D.C. TACHOGENERATOR							
Bosch SD-ISE	60°	1	3	2	10	4	5	9	11	3	2	1
Indramat MAC	120°	V1	W1	U1	11	2	4	10	12	7	8	9
Indramat MAC	120°	B	C	A	11	2	4	10	12	7	8	9
Signal name		U	V	W	ØV	DC-	DC+	+15V	-15V	SE1	SE2	SE3
		A	B	C	15	14	8	2	11	5	4	3
		TERMINALS			CONNECTOR CN3 (pin)							
					<div><div><div>1</div><div>8</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div><div><div>9</div><div>15</div></div></div></div></div>							
					MOVABLE FEMALE CONNECTOR (VIEW SOLDER SIDE)							
		CONVERTER SIDE CONNECTIONS										

### NOTE:

1. The motors BOSCH SD-ISE are compatibles only with the converters MODEL: BTD1-T1-000-220-XXX, FW: TACH 1A
2. The motors INDRAMAT MAC are compatibles only with the converters MODEL: BTD1-T2-000-220-XXX, FW: TACH 0A

The MODEL and the FIRMWARE (FW) are indicated on the nameplate of the converter .  
For other motors (with transducer of the same type), contact the technical service ALTER.

### CONNECTION OF THE SCREENS

1. Connect to the terminal E1 of the converter to the screens of the power cables (three-phase power supply and motor).
2. Connect the shields of the power cable and transducer cable to the ground terminal of the motor (or to the casing).
3. Connect the cable's shield of the signal (Speed reference and motor transducer) to the E2 terminal.

## MOTOR TO DRIVE CONNECTIONS

### BRUSHLESS MOTORS EQUIPPED WITH SPECIAL ENCODER

MOTOR MODEL	CONNECTIONS MOTOR SIDE													
	MOTOR CABLE			FEEDBACK CABLE										
				ENCODER TTL										
ACM series 155	V	W	U	A+J	F	G	H	P	B	N	M	R	L	C
ALLEN-BRADLEY series F-4050	A	B	C	K	P	T	N	C	D	A	B	E	F	L
BRUSATORI series BR 01-02	5	3	1	3	13	12	16	7	8	5	6	9	10	4
BRUSATORI series BR 05-07-08-09	W	V	U	P	C	E	G	L	K	H	J	M	N	A
BRUSATORI series BR 05-07-08-09	C	B	A	P	C	E	G	L	K	H	J	M	N	A
LAFERT-SELCA series T (new)	W	U	V	A	H	G	F	P	B	M	N	R	L	C
MITSUBISHI series HA-SA152	U	V	W	S	M	H	K	A	B	C	D	F	G	R
R.C.V. series UL5 e UL7	C	B	A	E	D	C	P	J	F	M	K	L	H	A
R.C.V. series UL5 e UL7	yel	Red	blu	E	D	C	P	J	F	M	K	L	H	A
R.C.V. series UL5 e UL7	C	B	A	16	4	6	5	11	12	1	2	3	13	15
R.C.V. series UL5 e UL7	yel	Red	blu	16	4	6	5	11	12	1	2	3	13	15
R.C.V. series UL5 e UL7	6	2	1	16	4	6	5	11	12	1	2	3	13	15
Signal name	U	V	W	+5V	SE3	SE1	SE2	A	$\overline{A}$	B	$\overline{B}$	Z	$\overline{Z}$	ØV
	A	B	C	6	8	10	9	1	2	3	4	5	14	25
	TERMINALS			CONNECTOR CN3 (pin)										
				<div><div><div>1</div><div>13</div></div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>14</div><div>25</div></div></div><div>MOVABLE FEMALE CONNECTOR (VIEW SOLDER SIDE)</div></div>										
CONVERTER SIDE CONNECTIONS														

#### NOTE:

The motors indicated in the table are compatible with converters BTD1-E0-000-220-XXX, FW: ENC 0A

The MODEL and the FIRMWARE (FW) are indicated on the nameplate of the converter .

For other motors (with transducer of the same type), contact the technical service ALTER.

#### CONNECTION OF THE SCREENS

1. Connect to the terminal E1 of the converter to the screens of the power cables (three-phase power supply and motor).
2. Connect the shields of the power cable and transducer cable to the ground terminal of the motor (or to the casing).
3. Connect the cable's shield of the signal (Speed reference and motor transducer) to the E2 terminal.

**MOTOR TO DRIVE CONNECTIONS**  
for FANUC motor with 2500 / 10000 PPR INCREMENTAL ENCODER  
(For specific drive only)

MOTOR MODEL		CONNECTIONS MOTOR SIDE															
TYPE	ENCODER (PPR)	MOTOR CABLE			FEEDBACK CABLE												
					ENCODER TTL												
5-0, 4-0, 3-0	2500	Nero	Rosso	Bianco	J,K	C	P	L	M	A	D	B	E	F	G	N,T	
2-0, 1-0	2500	3	1	2	J,K	C	P	L	M	A	D	B	E	F	G	N,T	
0, 5, 10, 20M, 20, 30	2500	C	A	B	J,K	C	P	L	M	A	D	B	E	F	G	N,T	
30R	2500	E,F	A,B	C,D	J,K	C	P	L	M	A	D	B	E	F	G	N,T	
α12/3000	10000	C	A	B	J,K	C	P	L	M	A	D	B	E	F	G	N,T	
Signal name		U	V	W	+5V	C1	C2	C4	C8	A	$\overline{A}$	B	$\overline{B}$	Z	$\overline{Z}$	ØV	
		A	B	C	6	10	9	8	7	1	2	3	4	5	14	25	
		TERMINALS			CONNECTOR CN3 (pin)												
					<div><div><div>1</div><div>13</div></div><div><div>14</div><div>25</div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div>												

**NOTE:**

The motors indicated in the table are compatible with converters MODEL: BTD1-E1-000-220-XXX, FW: 298-11-2

The MODEL and the FIRMWARE (FW) are indicated on the nameplate of the converter .

For other motors (with transducer of the same type), contact the technical service ALTER.

**CONNECTION OF THE SCREENS**

1. Connect to the terminal E1 of the converter to the screens of the power cables (three-phase power supply and motor).
2. Connect the shields of the power cable and transducer cable to the ground terminal of the motor (or to the casing).
3. Connect the cable's shield of the signal (Speed reference and motor transducer) to the E2 terminal.

# MOTOR TO DRIVE CONNECTIONS

## BRUSHLESS MOTORS EQUIPPED WITH RESOLVER

MOTOR MODEL				NOTE	CONNECTIONS MOTOR SIDE							
TYPE	MOT POLES	RES POLES	MOTOR CABLE		FEEDBACK CABLE							
					RESOLVER							
A.B.B. series 8	6	2	2	V	W	U	7	5	1	2	11	10
ACM series BRL 152	6	2	2	U	V	W	F	D	B	A	C	E
BAUMULLER series DS100M	6	2	2	V	W	U	10	12	6	5	8	1
BAUMULLER series DS400M	6	2	2+6	V	W	U	10	12	6	5	8	1
BRUSATORI series BR	8	2	3+6	B	C	A	V	U	F	E	D	C
BRUSATORI series BR (dal 10/2000)	8	2	3+6	C	A	B	V	U	F	E	D	C
Control Techniques series DUTY MAX	6	2	2+6	B	A	C	A	B	D	C	E	F
Control Techniques series MSB	6	2	2	B	A	C	B	A	F	E	D	C
Control Techniques series MSB	6	2	2	W	V	U	2	1	6	5	4	3
E.C.S. (made by SBC)	8	2	3	B	A	C	A	B	F	E	D	C
HDT LOVATO B10, B14, B20	6	2	2+6	gial	ros	azz	D	F	C	E	A	B
ISOFLUX series 6 e 7	4	2	1	G	C	F	7	5	1	2	11	10
LAFERT-SELCA series S	6	2	2	V	W	U	7	11	6	2	3	1
LAFERT-SELCA series S	4	2	1	V	W	U	11	7	6	2	3	1
LAFERT-SELCA series T (old)	6	2	2	3	4	2	11	7	3	2	6	1
LAFERT-SELCA series T (new)	6	2	2	B	C	A	11	7	3	2	6	1
LAFERT-SELCA series T (new)	6	2	2	V	W	U	11	7	3	2	6	1
LAFERT-SELCA series T (new)	4	2	1	V	U	W	11	7	2	3	6	1
MAGNETIC	6	2	2	U	V	W	E	A	G	H	C	B
NUM series BMG,BMH,BMS	6	6	4	B	A	C	B	A	D	C	E	F
NUM series BPG	6	6	4	1	6	2	7	10	2	1	11	12
R.C.V. series UL5 e UL7	8	2	3	B	C	A	F	D	C	E	A	B
R.C.V. series UL5 e UL7	8	2	3	ros	gial	blu	F	D	C	E	A	B
SBC series MB	8	2	3+6	B	A	C	A	B	E	F	C	D
SELCA tipo R	6	6	4	U	V	W	7	11	6	1	2	3
STOEBER	6	2	2	2	3	1	8	7	3	4	1	2
VICKERS series FAS-T	6	2	2	C	A	B	B	D	H	G	C	E
VICKERS series FAS-T	6	2	2	W	U	V	B	D	H	G	C	E
VICKERS series FAS	8	8	5+6	W	U	V	D	B	H	G	C	E
VICKERS series FAS	8	8	5+6	C	A	B	D	B	H	G	C	E
Signal name				U	V	W	REF+	REF-	SIN+	SIN-	COS+	COS-
				A	B	C	5	8	4	7	3	6
				TERMINALS			CONNECTOR CN3 (pin)					
							<div>1<div><div></div><div></div><div></div><div></div><div></div></div><div>6<div></div><div></div><div></div><div></div></div>59</div>					
				MOVABLE FEMALE CONNECTOR (VIEW SOLDER SIDE)								
				CONVERTER SIDE CONNECTIONS								

See the notes on the next page.



**NOTE:**

1. Motors compatible only with the converter MODEL: BTD1-R2-000-220-XXX, FW M4R20A
2. Motors compatible only with the converter MODEL: BTD1-R2-000-220-XXX, FW M6R20A
3. Motors compatible only with the converter MODEL: BTD1-R2-000-220-XXX, FW M8R20A
4. Motors compatible only with the converter MODEL: BTD1-R6-000-220-XXX, FW M6R60A
5. Motors compatible only with the converter MODEL: BTD1-R8-000-220-XXX, FW M4R80A
6. For proper operation, you must change the phasing Engine (contact the technical service ALTER).

The MODEL and the FIRMWARE (FW) are indicated on the nameplate of the converter .

For other motors (with transducer of the same type), contact the technical service ALTER.

**CONNECTION OF THE SCREENS**

1. Connect to the terminal E1 of the converter to the screens of the power cables (three-phase power supply and motor).
2. Connect the shields of the power cable and transducer cable to the ground terminal of the motor (or to the casing).
3. Connect the cable's shield of the signal (Speed reference and motor transducer) to the E2 terminal.