INSTALLATION & QUICK START GUIDE: SERIES ERDP DESIGN 5

INSTALLATION AND START-UP GUIDE

This document provides information for the initial installation of the PHD ERDP Remote Drive. All steps / sections should be followed to ensure proper, and safe, functioning of the ERDP. Contact PHD for additional information.

SECTIONS

MOUNTING OF REMOTE DRIVE

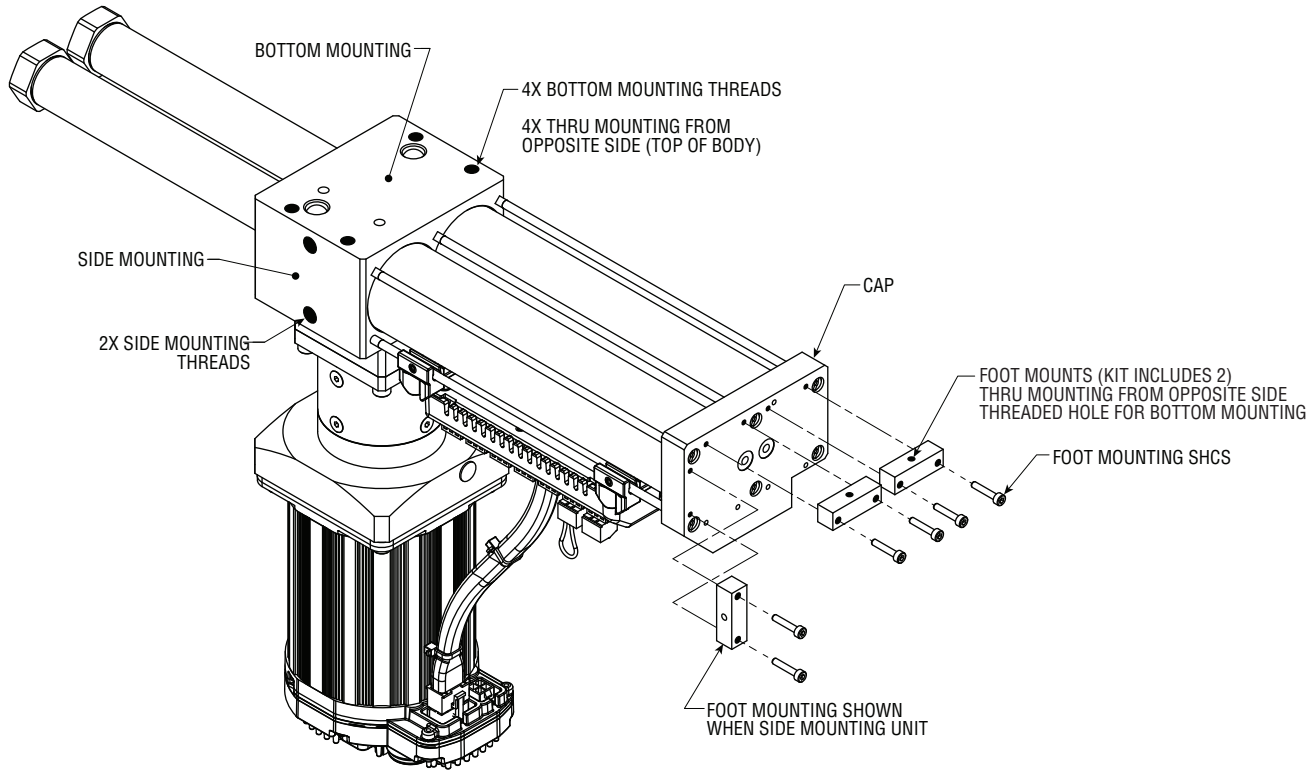
The Remote Drive body must be securely mounted prior to use. The unit may be mounted on the bottom or side as indicated below. Applications where actuator and air line tubing will be moving independently of the ERDP, PHD recommends the addition of foot mounts to secure the cap. See the ERDP Catalog for mounting dimensions. Mounting should be performed by qualified personnel. Metric information shown in [ ]. See page 6 for mounting dimensions of Regen clamp and power supply.

MAXIMUM RECOMMENDED MOUNTING TORQUES

MODEL NUMBER	BOTTOM MOUNTING THREADS			THRU MOUNTING FROM OPPOSITE SIDE (TOP)			SIDE MOUNTING THREADS		
	THREAD	in-lb	Nm	SHCS	in-lb	Nm	THREAD	in-lb	Nm
ERDP5 SIZE 4	M8 x 1.25 x 0.472 [12] ↧	250	28	M6 x 60 mm long min	100	11	M10 x 1.5 x 0.866 [22] ↧	500	56

FOOT MOUNTING	SHCS FOOT MOUNTING TO CAP			THRU MOUNTING OF FOOT			BOTTOM MOUNTING OF FOOT		
	THREAD	in-lb	Nm	SHCS	in-lb	Nm	THREAD	in-lb	Nm
92947-04-3	M3 x 0.5 x 0.630 [16] ↧	16	2	M3 x 15 mm long min	16	2	M4 x 0.7 x 0.394 [10] ↧	35	4

NOTES:
1) Assumes use of at least 75% of full thread depth.
2) Assumes use of high strength steel socket head cap screws.
3) PHD recommends use of threadlocker on mounting threads.

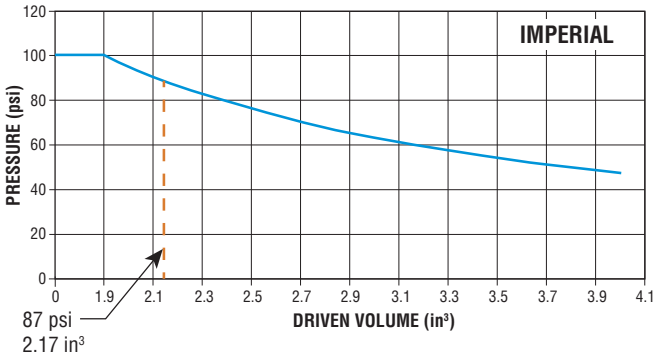


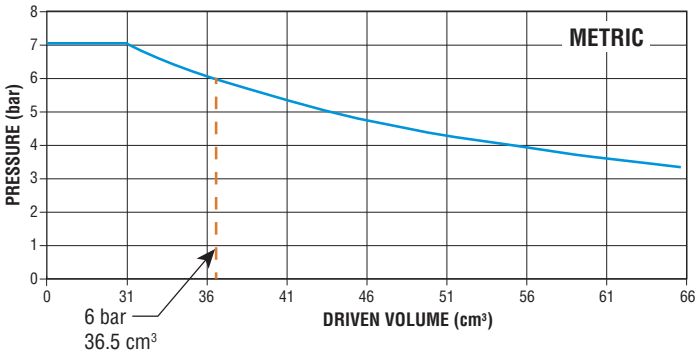
ENGINEERING DATA & EXAMPLE: SERIES ERDP DESIGN 5

SPECIFICATIONS	ERDP54
MOTOR POWER SUPPLY(1)	480 W(3), 110/220 VAC, 50/60 Hz Input
MOTOR CONTROLLER POWER SUPPLY(2)	5 W Minimum, 24 VDC
TYPICAL NOISE LEVEL	50 dB
ACTUATION TIME(4)	380 mS Maximum
WEIGHT	17.44 lb [7.91 kg]
SEAL COMPATIBILITY	Paraffin-based lubrication oils for pneumatics

NOTES:
(1) Supplied with Remote Drive
(2) Supplied by customer
(3) Maximum capability of power supply; typical energy consumption in drive mode can be much lower depending on application
(4) Time for driven actuator to open or close (grippers or clamps), extend or retract (linear cylinders), rotate (rotaries), or escape component (escapements)

DRIVEN VOLUME = Actuator volume (one direction) + airline volume (one direction) + additional volumes
(example: valving placed between ERDP54 and multiple driven actuators)





AIR LINE TUBE LENGTH CALCULATION

The length of air line tubing can be chosen to control the pressure that the ERDP applies to the connected actuator(s). To do so, determine the desired operating PRESSURE and use the charts above and at right to calculate the required air line tube length with the following formulas.

IMPERIAL:
Air Line Tube Length [in] = (Driven volume [in³] – Actuator volume [in³] – Additional Volumes [in³]) / Air Line Tube I.D. area [in²]

METRIC:
Air Line Tube Length [cm] = (Driven Volume [cm³] – Actuator volume [cm³] – Additional Volumes [cm³]) / Air Line Tube Area [cm²]

Air Line Tube Length Example Calculation
The ERDP is used to drive a GRTx3x gripper. Given a desired Operating Pressure of 87 psi [6 bar], use the charts above to find the corresponding Driven Volume. Then use the formula to calculate the recommended air line tubing length. Use of tubing, longer than recommended length, will decrease the pressure provided to the actuator. Tubing length, shorter than the recommended length, will increase pressure supplied to the actuator, up to 100 psi [6 bar]. The calculated recommended length of tubing can be varied by increasing or decreasing the inner diameter (I.D.) of the tubing.

PHD recommends using the largest I.D. air line tube possible, larger tubing decreases heat generated by the compression of air. It is recommended to use higher temperature rated tubing, such as Nylon.

Example shown below.
Air Line Tube Length = (2.17 in³ [36.5 cm³] – 0.72 in³ [12 cm³) / 0.0123 in² [0.045 cm²]
Air Line Tube Length = 118 in [5.4 meter]

AIR LINE TUBE - COMMON SIZES*

TUBE O.D. (in)	TUBE I.D. (in)	AIR LINE TUBE I.D. AREA (in²)
1/8	0.070	0.0038
5/32	0.106	0.0088
1/4	1/8	0.0123
1/4	5/32	0.0192
1/4	3/16	0.0276
TUBE O.D. (mm)	**TUBE I.D. (mm)**	**AIR LINE TUBE I.D. AREA (cm²)**
3	1.8	0.025
4	2.4	0.045
6	4	0.126

***NOTE**: Tube I.D. values are typical for Nylon tubing and actual values may vary depending on manufacturer of tubing.

SIZE	TOTAL DIAMETRAL JAW TRAVEL		TOTAL CLOSE GRIP FORCE AT 87 psi [6 bar]		GRIPPER WEIGHT		CLOSE OR OPEN TIME 87 psi [6 bar]	DISPLACE-MENT	
	in	mm	lb	N	lb	kg	sec	in³	cm³
GRTx1x	0.236	6	44	196	0.27	0.12	0.09	0.10	1.6
GRTx2x	0.315	8	112	499	0.59	0.27	0.03	0.30	5
GRTx3x	0.472	12	168	747	0.95	0.43	0.04	0.72	12
GRTx4x	0.630	16	218	971	1.75	0.80	0.06	1.41	23
GRTx5x	0.787	20	378	1683	2.82	1.28	0.07	3.00	49
GRTx6x	1.024	26	569	2531	5.1	2.32	0.15	5.63	92
GRTx7x	1.260	32	880	3912	8.75	3.98	0.30	10.75	176
GRTx8x	1.575	40	1452	6459	15.5	7.05	0.40	21.92	359

Minimum Operating Pressure is 30 psi [2 bar] for standard unit and 60 psi [4 bar] for spring assist unit.

RECOMMENDED AIR LINE TUBE LENGTH CALCULATION

	IMPERIAL	METRIC
ACTUATOR VOLUME	0.72 in³	12 cm³
AIR PRESSURE	87 psi	6 bar
DRIVEN VOLUME	2.17 in³	36.5 cm³
SELECTED AIR LINE TUBE I.D.	Ø 1/8 in	Ø 2.4 cm
AIR LINE TUBE I.D. AREA	0.0123 in²	0.045 cm²

REMOTE DRIVE CONNECTIONS: SERIES ERDP DESIGN 5

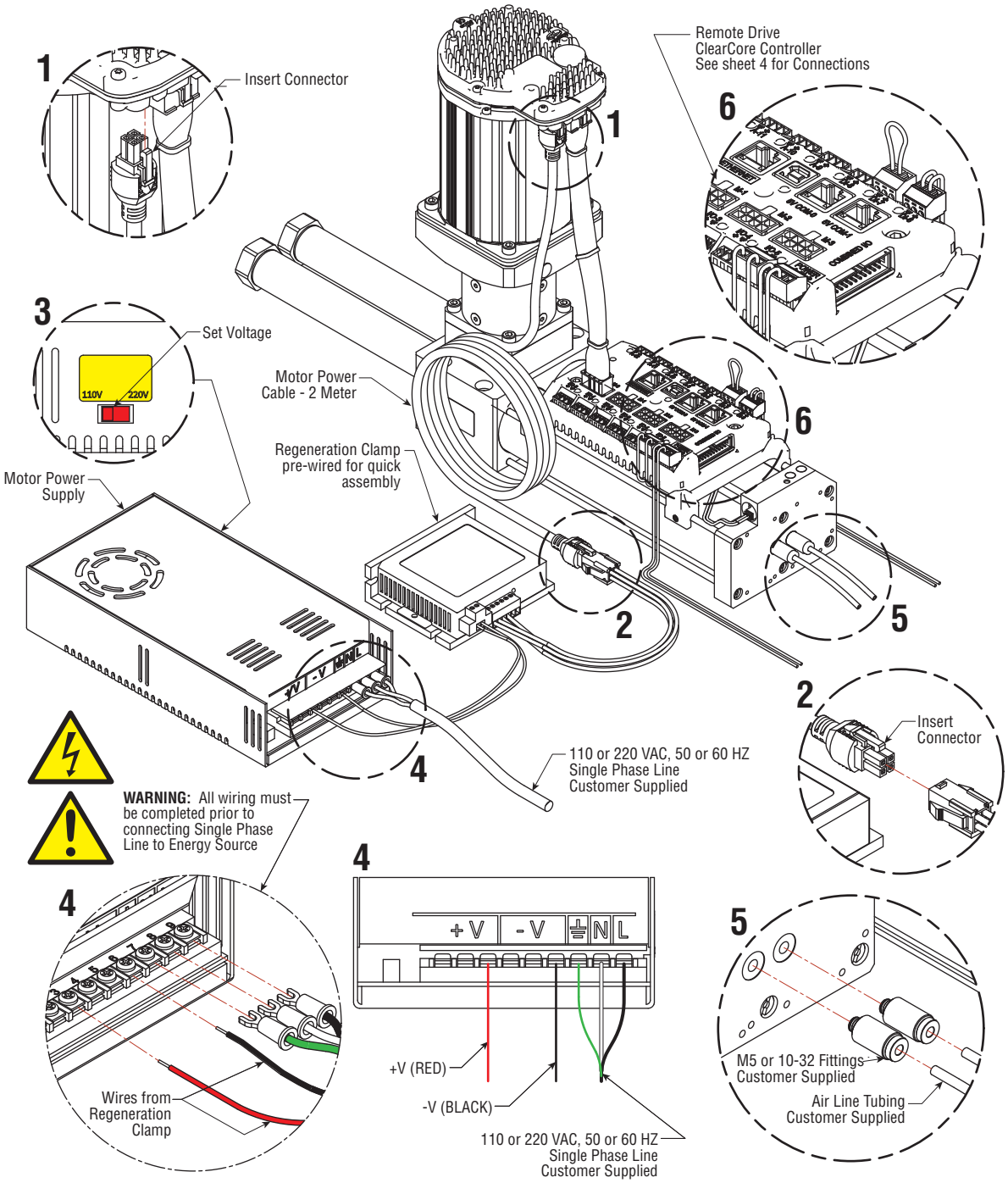
UNIT CONNECTIONS

The ERDP Remote Drive should not be connected to the energy supply until all other connections have been made. Connection and installation should only be performed by qualified personnel. The items shown below are required to utilize the Remote Drive:

The following items are not supplied:

- PLC or other system level control
- 24 VDC connection to motor controller (typically from PLC)
- 110 or 220 VAC, 50 or 60Hz, connection to motor power supply
- Fittings and air line tubing
- Actuator

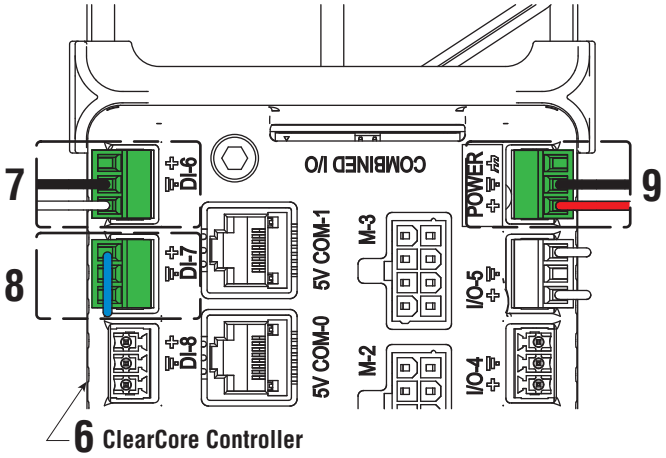
CONNECT COMPONENTS IN ORDER INDICATED



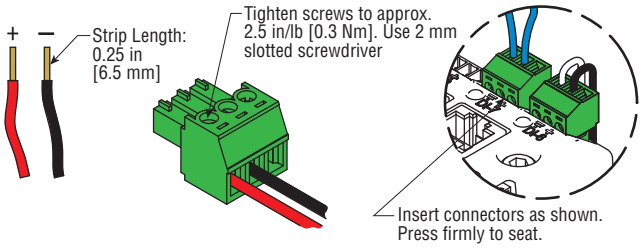
CONTROLLER CONNECTIONS: SERIES ERDP DESIGN 5

WIRING TEKNIC CLEARCORE™ CONTROLLER

The ClearCore Controller comes preprogrammed from the factory. The ERDP Remote Drive should not be connected to the energy supply during the installation of connectors in the controller. Installation should only be performed by qualified personnel. For more information on the ClearCore Controller, see https://teknic.com/products/io-motion-controller/

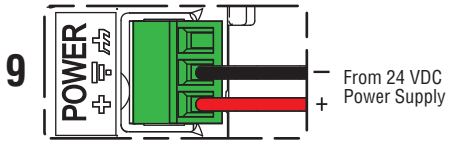


TERMINAL CONNECTIONS



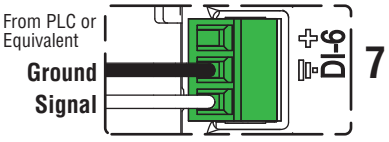
POWER SUPPLY CONNECTION

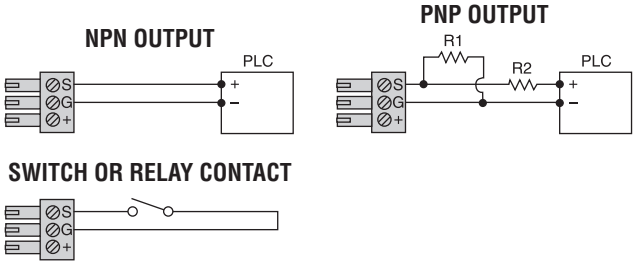
- Use PHD supplied screw terminal connector, Molex 0395105003, to connect output from 24 VDC power supply to connector (24 VDC typically available from PLC). Install wires and add resistor R1 and R2 (not supplied) as necessary.
- Plug male screw terminal connector into female POWER receptacle on controller.



TRIGGER SIGNAL CONNECTION

- Trigger signal can be switch or relay closure or an active signal from PLC.
- Connect output from PLC (or system controller) to “S” (signal) and “G” (ground) terminal of PHD supplied screw terminal connector.
- Plug male screw terminal connector into female “DI-6” receptacle on controller.



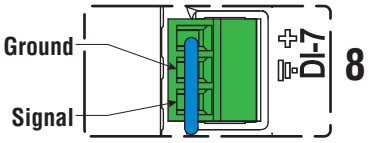


PNP OUTPUT RESISTOR REQUIREMENTS

PLC OUTPUT VOLTAGE	RESISTOR R1		RESISTOR R2	
	RESISTANCE	WATTAGE	RESISTANCE	WATTAGE
24 V	330 Ω	1/2 W	820 Ω	1 W
12 V	165 Ω	1/4 W	410 Ω	1/2 W
5V	82 Ω	1/8 W	Not Required	

ENABLE SIGNAL CONNECTION

- ERDP arrives configured to automatically enable motor upon power-up.
- If externally controlled enable/disable is desired, remove jumper from screw terminal connector installed in female “DI-7” receptacle on controller.
- External control of enable/disable is useful for E-stop and power savings during long dwell. **Note:** If unit is disabled, pressure equalizes between two ERDP output ports (analogous to center-closed valve).
- Connect output from PLC or E-Stop switch to “S” (signal) and “G” (ground) terminals of previously jumpered screw terminal connector. See Trigger Signal Connection section for information on connecting switch or PLC to enable connector.
- Plug male screw terminal connector into female “DI-7” receptacle on controller.



START-UP & CUSTOM SOLUTIONS: SERIES ERDP DESIGN 5

START-UP RECOMMENDATIONS

- Remote Drive should be securely mounted with all external tubing, valves, and actuator(s) attached prior to powering-up unit.
- Unit must be located in area or enclosure with adequate ventilation for cooling.
- Care must be taken to provide adequate clearance for attached actuator(s) to safely cycle.
- Start-up should only be performed by qualified personnel.

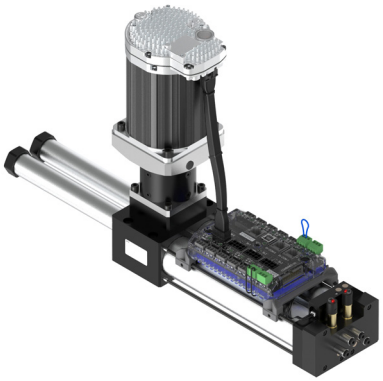
POWER-UP

- ERDP operates in servo-controlled “position mode” and needs to find “home” position to establish relationship between positions of motor and mechanics.
- Motor automatically homes upon power-up if enable jumper is present in DI-7 connector or first time external enable signal is applied.
- Homing takes less than 10 seconds.
- Upon loss of power or if unit is disabled, pressure equalizes between two ERDP output ports (analogous to center-closed valve).
- Unit automatically re-homes if power is lost and restored if enable jumper is present in DI-7 connector or first time external enable signal is applied.
- During homing, pressure is automatically removed from both ERDP output ports.
- After homing completes, unit will automatically move to triggered position, if trigger signal is present.

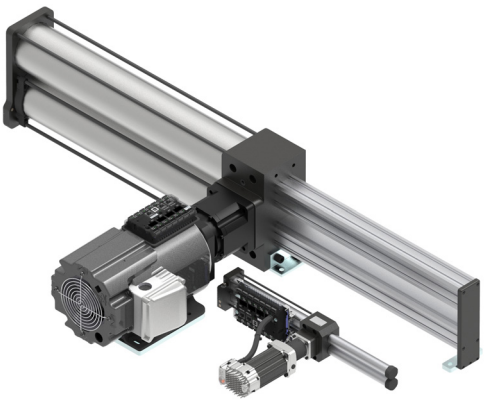
CUSTOM SOLUTIONS

- Can be configured as pump or vacuum generator
- Larger or smaller sizes
- Alternate motor mounting
- Air line tube cooling for higher cycle rates with bolt-on accessory
- Drive multiple actuators with bolt-on accessory
- Motor brake to hold pressure on driven actuator during loss of power or emergency system stop.

ALTERNATE MOTOR MOUNTING



MULTIPLE ACTUATORS



ADDITIONAL SIZES

ACCESSORY MOUNTING: SERIES ERDP DESIGN 5

MOUNTING OF REGEN CLAMP AND MOTOR POWER SUPPLY

Regen Clamp and Motor Power Supply should be securely mounted prior to connecting power to ERDP. Items should be in an area that prevents accidental contact with other components when energized. Energy supply should be switched off prior to installation. Installation should only be performed by qualified personnel. Metric dimensions shown in [ ]. Mounting hardware not included.