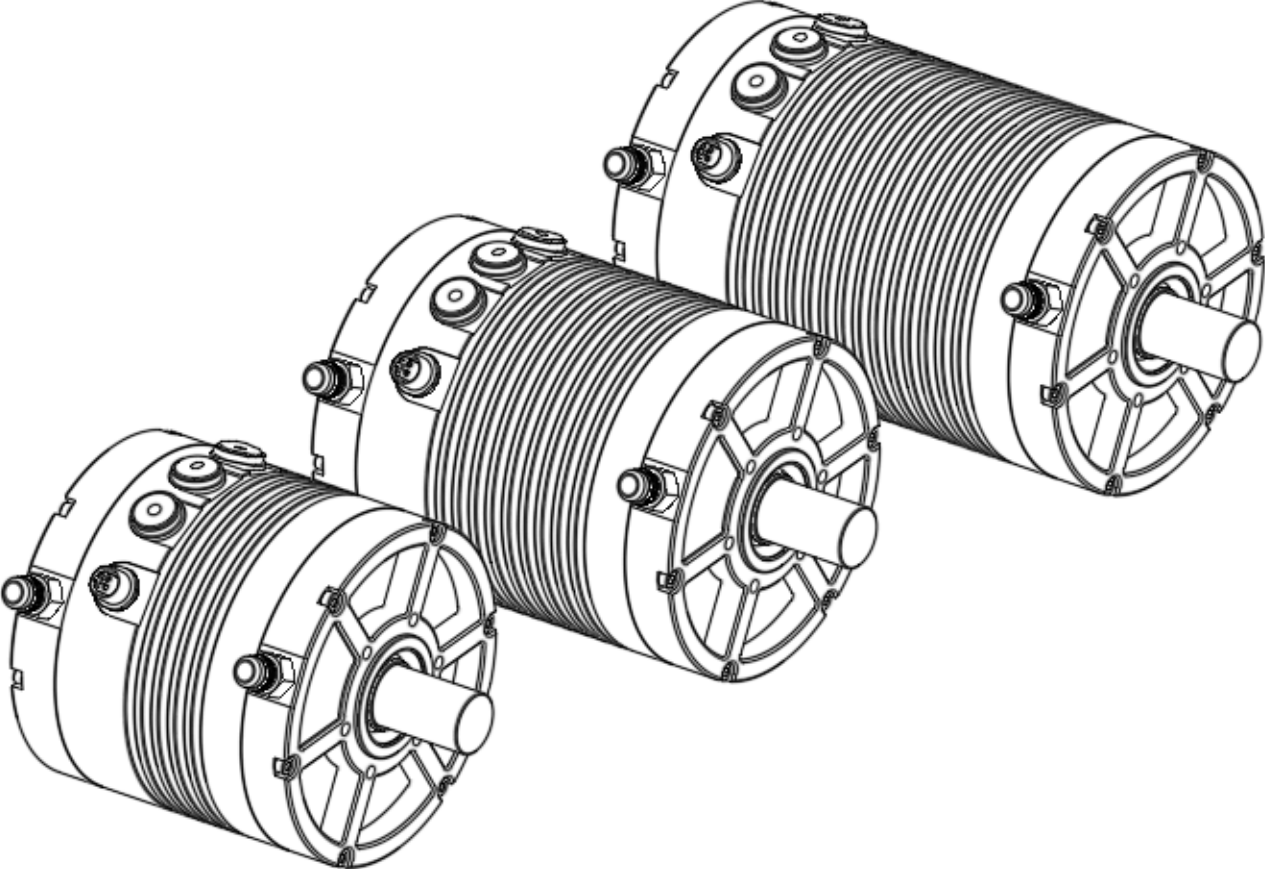


# PEREGRINE Installation and Operation Manual



## Overview

These instructions describe the motor and provide general information from installation and setup to operation.

## Safety Instructions

- Professional installation by a qualified electric motor technician required.
- Professional tuning by a qualified motor control engineer required.
- Prior to installation or maintenance, verify the controller and system are turned off and de-energized.
- Verify all connections are properly secured and insulated prior to the energizing of the system and running of the motor.
- Under certain conditions, the motor casing temperature may rise to unsafe- to-touch levels. Allow the motor to adequately cool down prior to maintenance to or the system near the motor.

## Handling/Storage

- Do not handle motors by the connected leads, coolant tubing, or their respective connections.
- While not in application, store in a dry even temperature location.

## Product Warranty

Refer to the Standard Terms and Conditions of Sale published at [dhxmachines.com/motors](http://dhxmachines.com/motors) for product warranty information. Warranty can be voided due to improper maintenance, improper installation, negligence, disassembly, or physical additions and/or modifications not authorized or completed by DHX Electric Machines, Inc. If a void of warranty occurs, customers will be responsible for the cost of repairs or replacement.

## Technical Support

For additional information regarding topics covered in this document or other application assistance, please contact us at [info@dhxmachines.com](mailto:info@dhxmachines.com).

## Motor Characteristics

<b>Tractive Effort Spec.</b>		<b>P20</b>	<b>P40</b>	<b>P60</b>
Nominal speed	RPM	4400	4400	4400
Continuous torque	Nm	25	50	75
Peak torque (S2 - 20s)	Nm	40	80	120
Continuous power	kW	11.5	23.0	39.3
Peak power (S2 - 20s)	kW	18.4	36.8	62.8
Max. speed	RPM	6500	6500	6500
<b>Electrical Spec.</b>				
Motor type	SMPM (TEWC)	SMPM	SMPM	SMPM
DC Bus Voltage (Nom.)	VDC	96	96	96
Rated current	Arms	125	250	375
Peak current (S2 - 30s)	Arms	212	425	638
Voltage Constant (kE)	mVrms/RPM	12.50	12.50	12.50
Torque Constant (kT)	Nm/Arms	0.2	0.2	0.2
No. of poles	-	10	10	10
Max. efficiency		95%	95%	95%
<b>Mechanical Spec.</b>				
Rotor inertia	kg.m <sup>2</sup>	0.000688	0.0012488	0.001834
Max. coolant inlet temperature	°C	50	50	50
Min. coolant flow rate	LPM	3.8	7.68	11.4
Total mass	kg	5.4	8.6	11.6
Exterior volume	L	1.1	2.2	2.7
Torque density (gravimetric)	Nm/kg	7.4	9.3	10.4
Torque density (volumetric)	Nm/l	36.4	37	44.4
<b>Feedback Sensors</b>				
Encoder	Encoder RLS RM58AC0001S10F2F10			
Temp. Sensor	RTD Sensors, PTFM Type, 1.2 x 4 mm, -50 °C 600 °C, 1kohm, MEAS PTF Series			

\*For alternate motor voltages, refer to Appendix A

## Operation Considerations

- Maximum loading conditions should adhere to the motor's respective S2 - 20s conditions.
- Derating of the motor should occur at an RTD reading of 80°C.

## Installation

### Mounting

Rotate the motor to desired position to accommodate for optimal lead and coolant routing. Mount the motor at its front face through the location of the 50mm spigot and secured with six M6 bolts (not provided) with a maximum tightening torque of 5Nm, Figure 1. To resist loosening from vibration, insert mounting bolts with Loctite Threadlocker Blue 242 (not provided) or equivalent. No permanent adhesives should be used. .

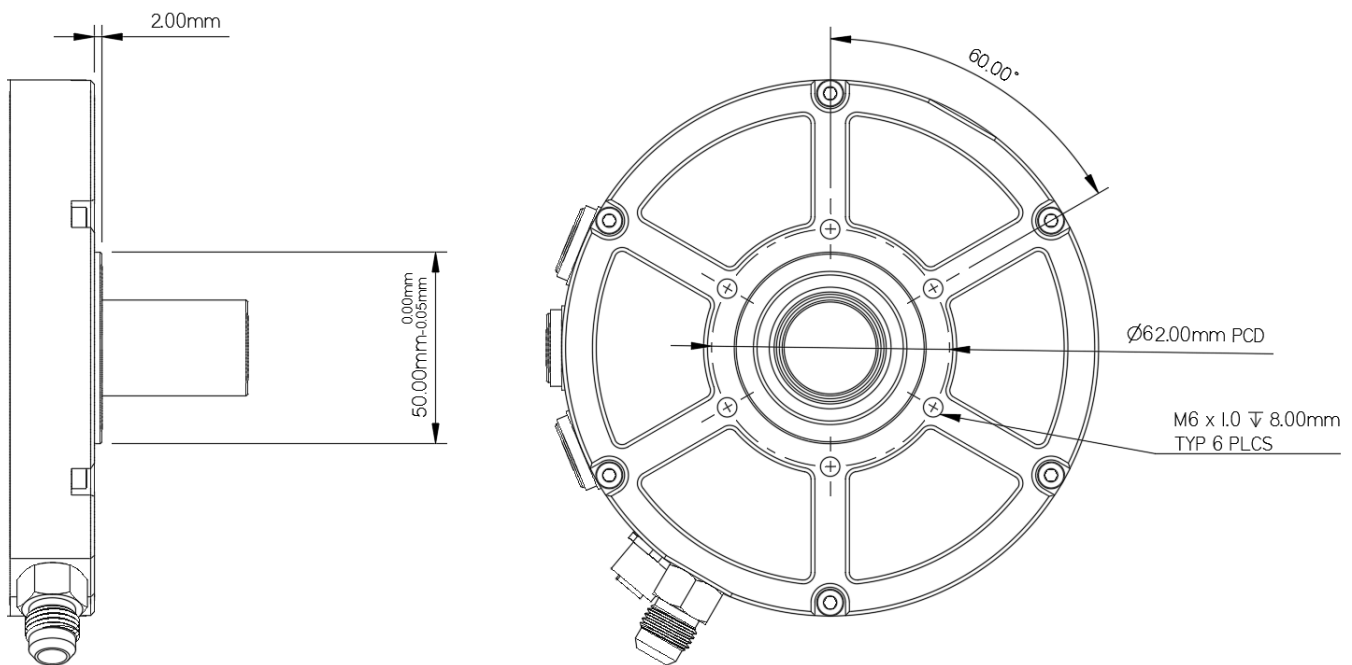


Fig.1

### Coupling

The shaft by default is 25mm in diameter and extends 40mm from the front of the motor. The shaft should be coupled with a system that does not cause a radial load greater than 1.5kN. If assembled with a radial load greater than 1.5kN, this may cause premature failure of the bearings and shaft. If using a rigid coupling, the motor shaft and the system shaft will require accurate alignment. If adequate shaft alignment is not possible, it is recommended to use a flex coupling such as spider jaw couplings.

## Electrical Connections

### Terminals

Designation of the phase leads from the rear view of the motor is shown in Figure 2.

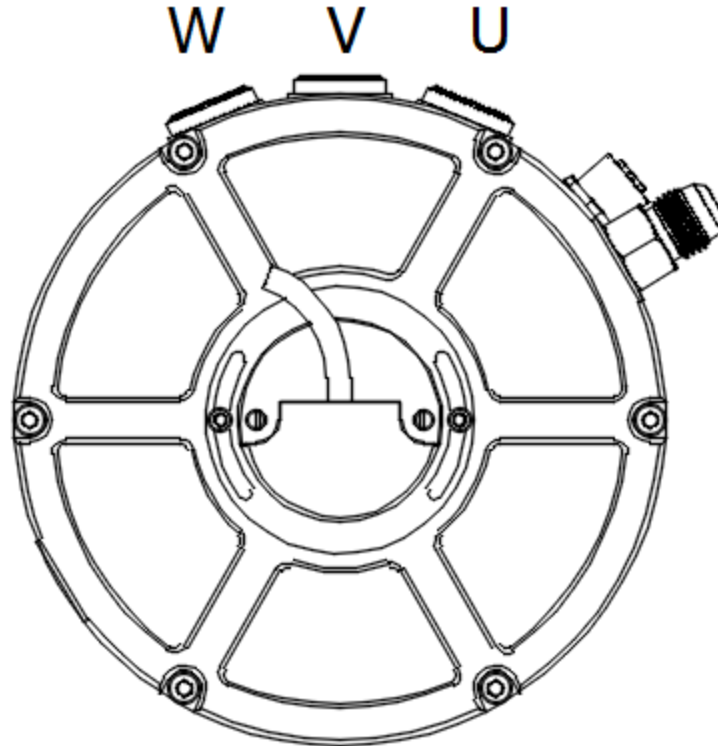


Fig. 2

### Phase Leads

To connect to the terminal pads, use 4 AWG or 25mm<sup>2</sup> single conductor cable with a 4 AWG ring connector (with a minimum of an M6 or ¼" hole) crimped on the end. Secure the leads to the terminal pad using an M6x1.0 bolt with a maximum tightening torque of 2Nm. Ensure all leads are properly insulated and not in contact prior to energizing.

### Encoder

The provided RLS RM58AC encoder is IP64 and IP68 protected. Encoder outputs two sinusoid channels VA and VB. Users will need to connect the encoder's cable shield to chassis ground for proper installation. More information and data sheet can be found at <https://www.rls.si/eng/rm58-up-to-13-bit-encoder-base-unit#downloads|data-sheet>.

Table 1

<i>Function</i>	Wire Color
Vdd	Red
GND	Orange
VA	Black
VB	Brown

**Temp Sensor**

Two 1KΩ RTD come pre-installed inside the motor. This is a direct temperature measurement of the coil windings. Most controllers only require one sensor, but two have been provided if multiple measurements are required or redundancy is needed. More RTD information can be found at:

<https://www.te.com/commerce/DocumentDelivery/DDEController?Action=srchrtv&DocNm=PTF-FAMILY&DocType=DS&DocLang=English>.

Figure 3 shows the pin orientation of the M12 RTD connector. More connector information can be found at:

<https://www.digikey.com/en/products/detail/te-connectivity-amp-connectors/T4171310004-001/7221375?s=N4lgTCBcDaKHAEAVALARgOwoMwoAx6QLR4pwgC6AvkA>

RTD Receptacle Pin Orientation

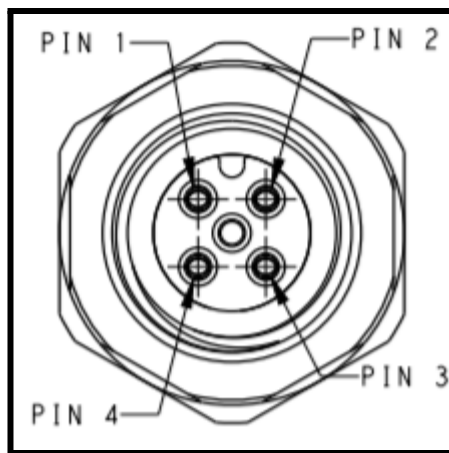


Fig.3 (From TE Connectivity Datasheet)

An M12 cable assembly for connection can be bought beforehand, a part number is provided below. Note, the part number provided has a cable length of 500mm. Additional lengths are made available by the manufacturer.

**Manufacturer: TE Connectivity**  
**Manufacture Part#: T4161120005-001**  
**Digi-Key Part#: A142276-ND**

Table 2 is the pin designation and associated wire color as provided by the manufacturer’s M12 cable assembly.

Table 2

Temp. Sensor	Wire Color	Pin #
Temp 1	White	2
	Black	4
Temp2	Brown	1
	Blue	3

## DHX Wire Harness\*

\*Additional information will be provided in Appendix B.

## Cooling System

- Each motor comes equipped with two -6 AN male fittings. The rear (encoder side) fitting is designated as the inlet and the front (shaft side) is designated as the outlet, Figure 4. Connect the cooling system to the motor with any preferred -6 AN female fittings.
- 50-50 distilled water / ethylene glycol mixture should be used as the coolant.
- Coolant is to be supplied at the specified minimum flow rate.
- The maximum inlet temperature of coolant is 50°C.
- Ensure all tubing is clean and free of debris prior to running.
- Figure 4 depicts a suggested cooling system layout. Other means of thermal rejection may be used other than a radiator/fan. A reservoir is recommended as it provides an easy access point for filling, minimizing air in the circuit, and provides some thermal capacitance.

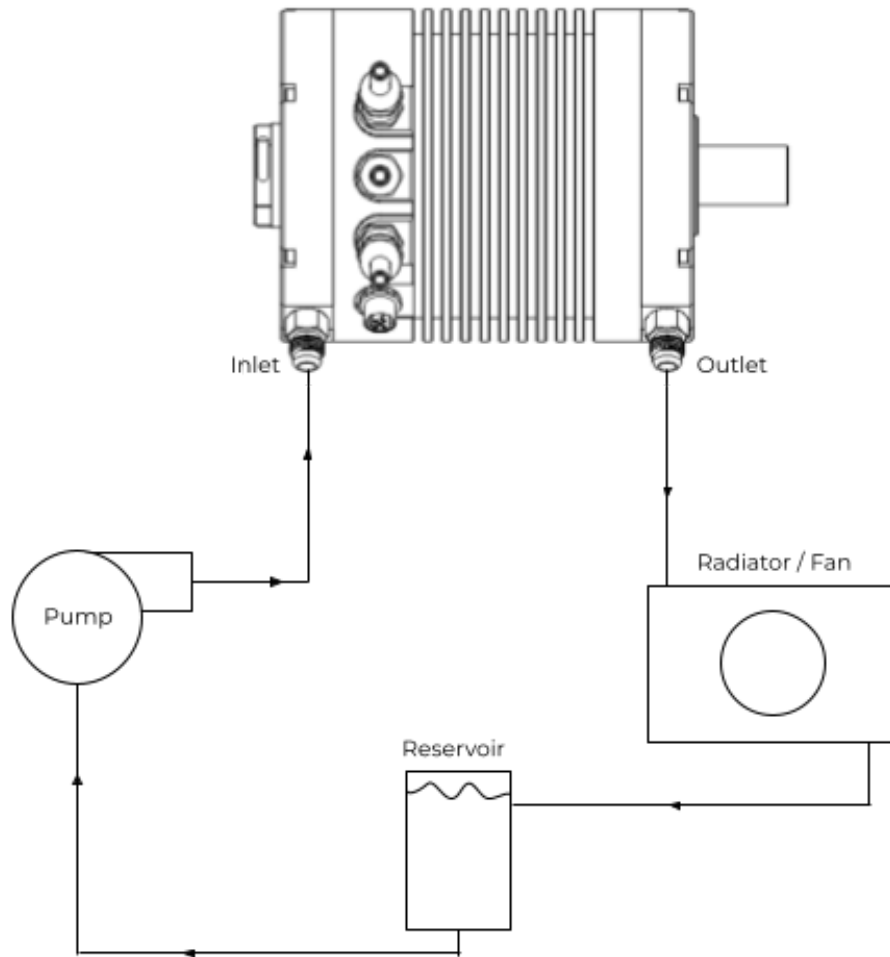
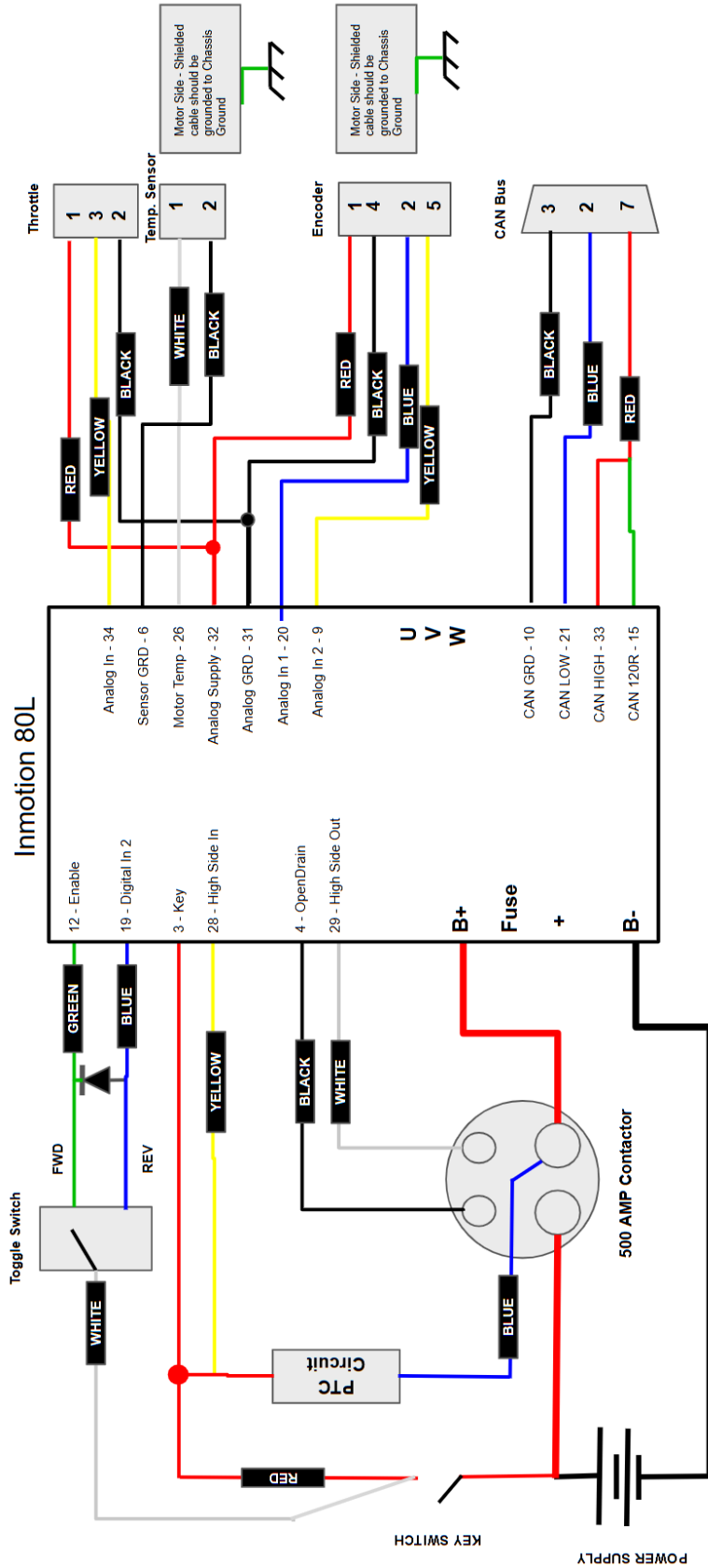


Fig. 4

## Appendix A

<b>Tractive Effort Spec.</b>		<b>P20-48V</b>	<b>P40-72V</b>
Nominal speed	RPM	4400	4400
Continuous torque	Nm	25	50
Peak torque (S2 - 20s)	Nm	40	80
Continuous power	kW	11.5	23.0
Peak power (S2 - 20s)	kW	18.4	36.8
Max. speed	RPM	6500	6500
<b>Electrical Spec.</b>			
Motor type	SMPM (TEWC)	SMPM	SMPM
DC Bus Voltage (Nom.)	VDC	48	72
Rated current	Arms	250	333
Peak current (S2 - 30s)	Arms	425	565
Voltage Constant (kE)	mVrms/ RPM	11.2	9.20
Torque Constant (kT)	Nm/Ar ms	0.09	0.150
No. of poles	-	10	10
Max. efficiency		95%	95%
<b>Mechanical Spec.</b>			
Rotor inertia	kg.m2	0.000688	0.0012488
Max. coolant inlet temperature	°C	50	50
Min. coolant flow rate	LPM	3.8	7.68
Total mass	kg	5.4	8.6
Exterior volume	L	1.1	2.2
Torque density (gravimetric)	Nm/kg	7.4	9.3
Torque density (volumetric)	Nm/l	36.4	37
<b>Feedback Sensors</b>			
Encoder	Encoder RLS RM58AC0001S10F2F10		
Temp. Sensor	RTD Sensors, PTFM Type, 1.2 x 4 mm, -50 °C 600 °C, 1kohm, MEAS PTF Series		

Appendix B



\*\*\*Encoder connector on motor side will be installed, see not above for shield grounding. Temp Sensor connector and pins will be provided if wire harness was purchased.