

## 800-1158 (7426AC) Amplifier

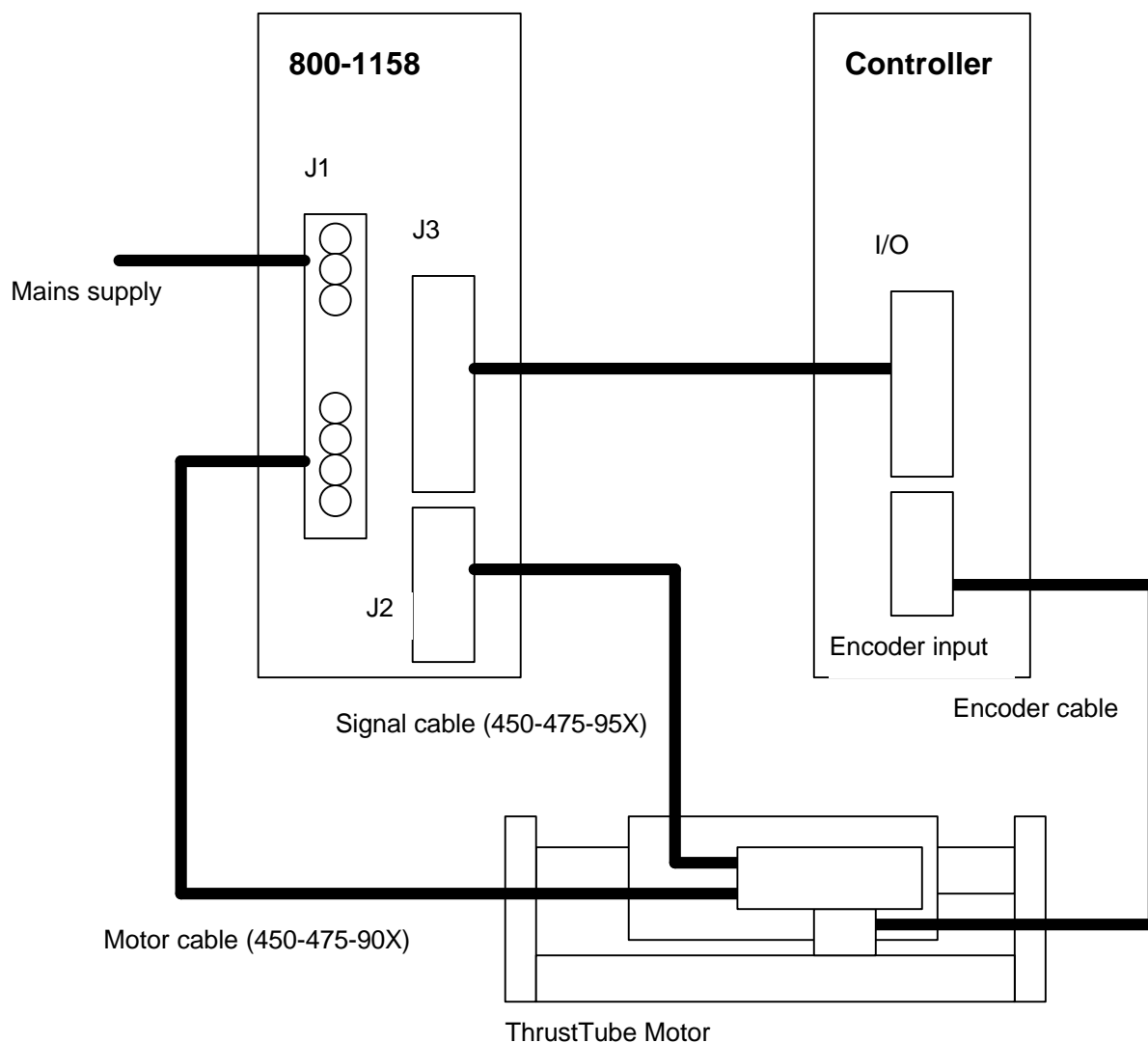
### 1. Description

This data sheet is intended as a guide to the connection and operation of the 800-1158 PWM servo amplifier to the ThrustTube range of linear motors. The forcers are fitted with an analogue Hall effect PCB to enable operation with the 800-1158 amplifier. Motors are supplied with cables assemblies ready for direct connection to the amplifier.

The amplifier has a continuous output current rating of 10A (limited to 3.5A) and peak output current rating of 20A (limited to 10A). The amplifier operates from a supply voltage of 32–264 VAC or 45–373 VDC. The sinusoidal motor commutation is achieved via analogue Hall effect devices mounted in the motor housing.

The amplifier operates in current command mode representing force (torque). An enable input and ready output is provided to allow for full servo integration along with positive and negative enable limit inputs. A motor over temperature input is available to disable the amplifier should the motor temperature sensor detect an excess temperature condition.

### 2. System block diagram



### 3. Connections

#### J1 - Screw terminal strip

Amplifier	SO06 Motor Cable	Motor Terminals
Earth	Green & Screen	Grounding Screw
U	Red	U
V	Yellow	V
W	Blue	W

#### J2 – Hall effect signals

Pin	Function	SO10 Motor Cable
1	Safety Gnd.	Screen
2	Hall U	Blue
3	Hall V	Violet
4	N/C	-
5	N/C	-
6	N/C	-
7	N/C	-
8	N/C	-
9	Motor over temperature	Pink
10	0V	Grey
11	Hall Vcc (+5v)	Red
12	0V	Green
13	N/C	-
14	0V	-
15	0V	-

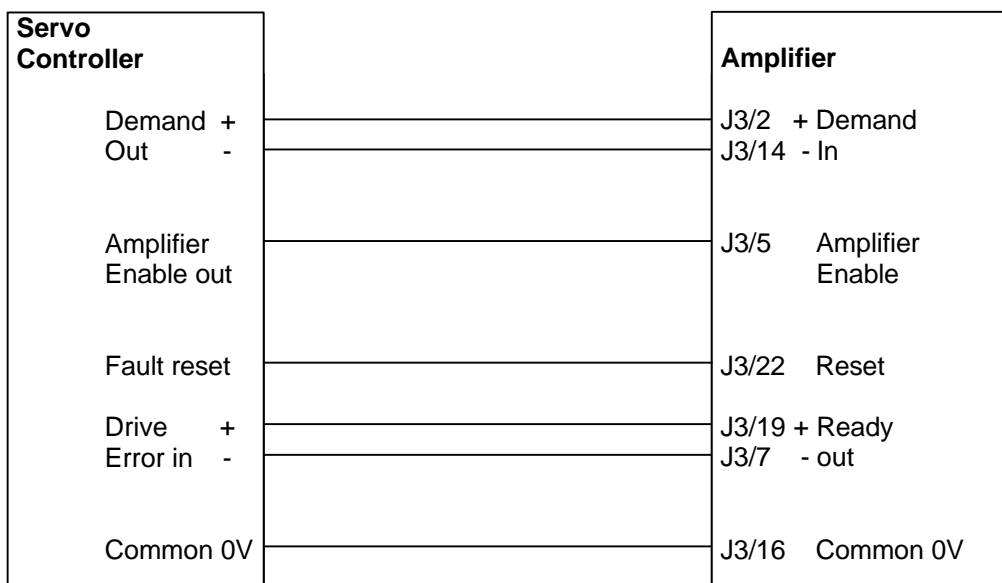
#### J3 – Inputs and outputs

Pin	Function	Colour
1	Safety Gnd	Screen
2	Demand +	Red (1)
3	NC	-
4	NC	-
5	Amplifier enable	White (2)
6	/ Normal output	-
7	Ready output -	Black (3)
8	Current ref output	-
9	NC	-
10	U current monitor	-
11	V current monitor	-
12	0V	-
13	0V	-
14	Demand -	Black (1)
15	NC	-
16	0V	Black (2)
17	/ Positive enable	(Link to 0V pin 12 if not required)
18	/ Negative enable	(Link to 0V pin 13 if not required)
19	Ready output +	Yellow (3)
20	Hall U Monitor	-

21	Hall V Monitor	-
22	/ Reset input	Blue
23	+ 5V @ 250 ma	-
24	+ 10V @ 5 ma	-
25	- 10V @ 5 ma	-

Numbers in brackets identify twisted pairs

#### 4. Servo integration



#### 4.1 Inputs

The digital input voltage range is 0 – 32V DC with a logic threshold of 2.5V

### Warning

### Digital inputs are not opto-isolated

#### a) Enable

The amplifier is enabled by a positive signal in the voltage range 2.5 to 32V DC applied to J3 pin 5. An internal 10K pull down resistor to zero volts is fitted for fail-safe operation.

#### b) Reset

Latching faults are reset by connecting J3 pin 22 to zero volts J3 pin 16 or by removing mains power from the amplifier and reconnecting after a delay to allow for the discharge of internal capacitors and status LED to extinguish. Latching faults are caused by the output being short circuit or the amplifier over temperature.

## c) Over temperature

The over temperature (forcer) function disables the amplifier when the input is open circuit or rises above 2.5 Volts. For correct operation with positive temperature coefficient (PTC) thermistors an external resistor will be required to ensure that the circuit operates correctly. A 3.9 K resistor is fitted on Hall effect circuit boards supplied with 8001158 amplifiers for this purpose. The sensor should be connected between J2 pin 9 and zero volts J2 pin 10. An internal 10K pull up resistor to 5 Volts is fitted for fail-safe operation.

## d) Positive / negative enable

The positive and negative direction sensitive enable inputs J3 pins 17 and 18, can be used to inhibit motion in one direction only.

E.g. when the positive limit is activated (greater than 2.5 Volts) travel can only be made in the negative direction.

If the inputs are not used they must both be connected to zero volts J3 pins 12 and 13 in order for the amplifier to enable.

## e) Demand

The differential demand input J3 pin 2 positive and J3 pin 14 negative, is scaled at 1Volt / Amp pk with an analogue input range of +/- 10V and input impedance of 94K.

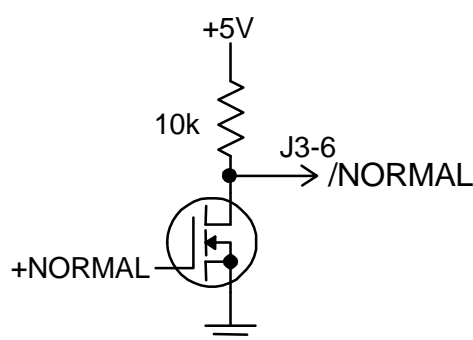
## f) Hall effects

The single ended Hall effect inputs J2 pin 2 and J2 pin 3 accept signals of +/- 2V pk centred on half the Hall circuit supply voltage (nominal 5V). These are internally amplified and offset to give signals on J3 pin 20 and J3 pin 21 of +/- 10V pk centred on zero volts.

## 4.2 Outputs

## a) Normal

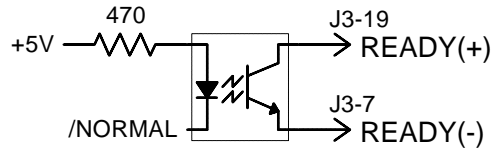
The normal output J3 pin 6 is in the form of a N-channel mosfet to zero volts with a 10K resistor connected as a pull up to 5V.



The maximum current rating is 250mA. The output is high when the amplifier is not enabled or when a fault is present.

## b) Ready

The opto-isolated ready output is available on J3 pin 19 positive and J3 pin 7 negative and is rated at 4mA at 32V DC. The output is in the on condition when the amplifier is enabled.



c) Current reference

The current reference output J3 pin 8 is the current demand signal to the PWM stage scaled +/- 10V = +/- peak current rating.

d) Current monitor

Two current monitor outputs are available, phase U J3 pin 10 and phase V J3 pin 11. The output is scaled +/- 10V @ +/- peak current.

e) Hall monitors

Hall U amplified signal is available on J3 pin 20 and the signal for Hall V is on J3 pin 21. The signals are scaled +/- 10V for an input signal of +/- 2V centered on Hall supply (5V) / 2

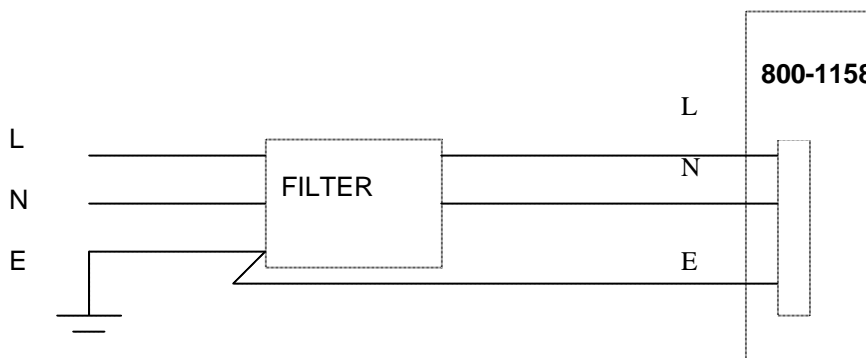
f) Front panel LED indications

The front panel LED indicates the amplifier operating condition as follows:

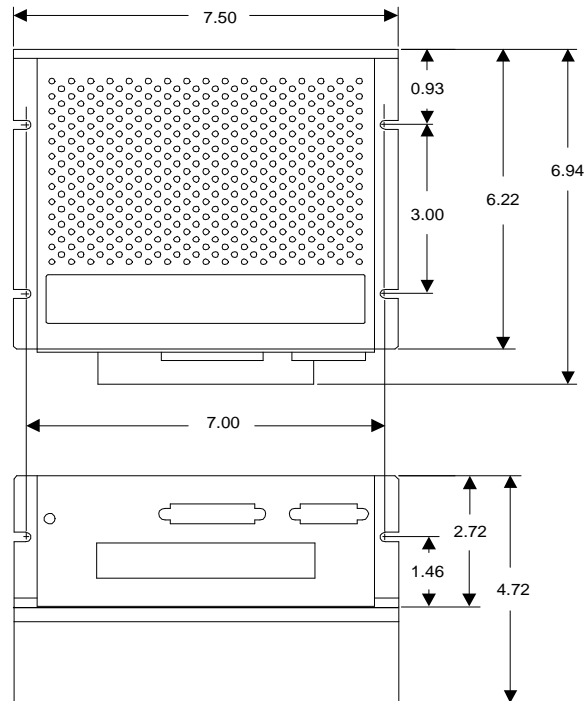
- Flashing green - Ready amplifier OK waiting enable input
- Green - Normal - amplifier enabled
- Red - Fault – over/under voltage or motor over temperature
- Flashing red - Latched fault – output short circuit or heat sink over-temperature (reset or power off to reset latching fault)

**5. Mains supply line filter**

An in line filter should be fitted in line with the mains supply of each amplifier, as close to the amplifier as possible with cable lengths kept to a minimum. A Schaffner FN2020-20-06 or equivalent should be used.



6. Amplifier dimensions



7. Specification

Continuous current	10 A
Continuous current limit	3.5 A
Peak current	20 A
Peak current limit	10 A
Input voltage range	32 – 264 VAC 47-53 Hz 45 – 373 VDC
Input current	16 A
Inrush start up current	37 A maximum
PWM frequency	17.2 kHz +/- 10%
Hall effect inputs	+/-2 Volts centred on Halls supply / 2
Hall effect supply	5 V +/- 5%
Operating temperature	0 to +70 °C
Storage temperature	-30 to +85 °C
Weight	1.7 kg