TRE3M
15-50/60/75

Max. Flow Rate
2.3 m³/h

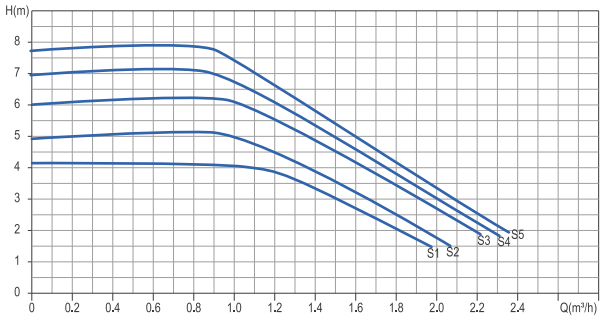
Max. Head
7.5m

Nameplate

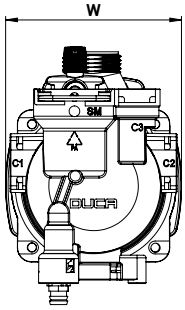
*Custom OEM Nameplate Design
Available Upon Request

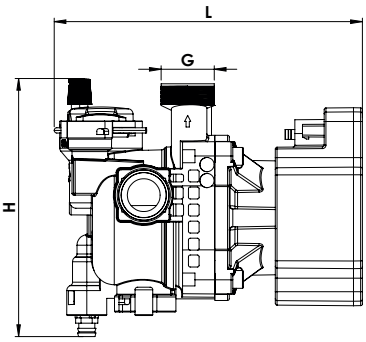
Performance Curve

TRE3M 15-50/60/75 Series



Dimension





W 99 mm
L 173,2 mm
H 146 mm

G 1”

Model Information

Model	Min/Max Temp (°C)	P1 Max	Voltage (V)	Nominal Current (A)	Inrush Current
TRE3M 15-50	+2 - +95	40W	230	0.37	<2A
TRE3M 15-60	+2 - +95	50W	230	0.45	<2A
TRE3M 15-75	+2 - +95	60W	230	0.55	<2A

PWM Mode

Pump driver board have been working in a two control modes that PWM and gear mode. In PWM mode pump speed change as a function of PWM input profile. When there is no PWM signal, pump driver board have been working in a gear mode. In gear mode, pump runs in five different speed. On the other hand pump driver board has a five LEDs for give information about operation status and error conditions.

Pump driver board has a two PWM signal that input PWM signal and output PWM. Input PWM signal works in 1 – 4 kHz range and changes the pump speed. Output PWM signal work as a feedback signal and it is fixed at 75 Hz. Output PWM give a information about the pump output power.

Optocoupler Isolation	AVAILABLE
PWM Output Frequency	75 Hz
PWM Input Frequency	1 – 4 kHz
Input voltage high level U_{IH}	4.0 – 24V
Input voltage low level U_{IL}	< 1V
High level input current I_H	3.5 mA – 10 mA
PWM adjustable range	0 – 100 %
Signal polarity	Fixed
Signal line length	< 3m
Rise and fall time	< T/1000

Table 2. PWM signal characteristics

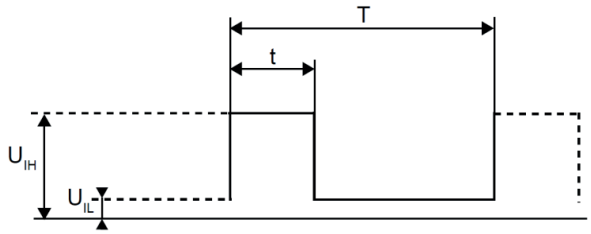


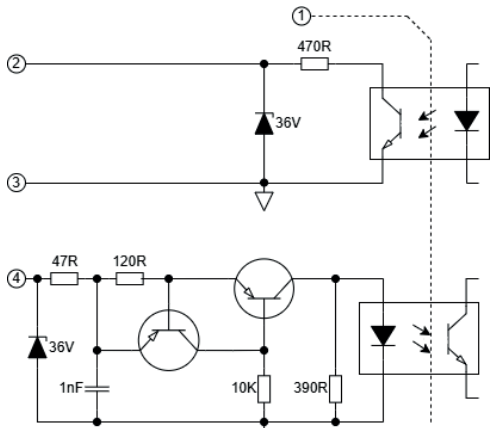
Figure 3. PWM signal characteristics waveform

PWM Interface

The PWM interface consists of an electronic part that connects the external control signal in isolation to the microcontroller of the pump driver board. In addition, the interface allows the user to avoid contact with hazardous voltage if the signal touches the wires when power is connected to the pump.

Position	Description
1	Galvanic Isolation
2	PWM Output
3	ISO GND
4	PWM Input

Table 3. Interface schematic description



PWM Input Signal Profile

PWM mode operating principle is given in the picture below. In PWM Mode, the pump can be driven at different speeds. When the PWM signal duty cycle value is low, circulating pump rotate high speed because if the PWM connection is damaged the circulating pump must be run at maximum speed to transfer heat from primary heat exchanger. With the help of hysteresis, the pump can be prevented from switching off and on continuously at low speeds.

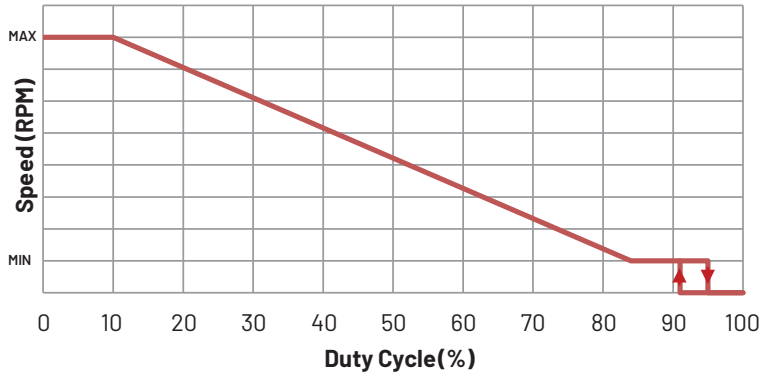


Figure 5. Input PWM waveform

Input PWM Duty Cycle (%)	Pump Driver Board Status
0	There is no PWM signal send to the pump driver board. So in this status pump driver have been work on a gear mode.
0 < Duty ≤ 10	Pump runs in maximum speed.
10 < PWM ≤ 84	Pump speed is linearly drops from the maximum speed to minimum speed.
84 < PWM ≤ 91	Pump runs in minimum speed.
91 < PWM < 95	In this range, hysteresis is used to stop the pump above 95 and drive it at minimum speed when it falls below 91 .
95 ≤ PWM ≤ 100	Pump stops running, Standby

Table 4. Input PWM description

PWM Output Signal Profile

The PWM output signal offers information below that about pump driver board.

- Current power consumption
- Warning
- Alarm
- Operating status

Position	Value	Description
X Axis	-	Output power consumption (W)
Y Axis	-	PWM output signal percentage (%)
A	%95	Standby, Pump stop
B	%90	Alarm Stop : Blocked pump
C	%85	Alarm Stop : Electric fault
D	%75	Warning
E	%0-%70	Slope: 1 % / watt PWM signal
F	%70	Saturation at 70 W

Table 5. Output PWM description

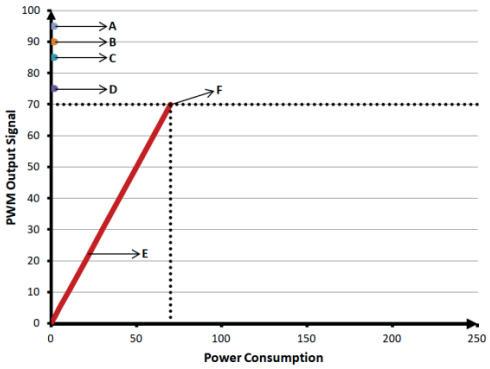


Figure 6. Output PWM Waveform