

Data sheet

# Oil Motor Pump BFPM Controller

## Application

The BFPM range is a series of Danfoss oil pumps in combination with a highly efficient permanent magnet motor, designed for use with small domestic oil burners.

**BFPM Electronic Controller** must be used for controlling the BFPM motor pumps (see separate data sheets for each BFPM oil motor pump).

### BFPM Electronic Controller features:

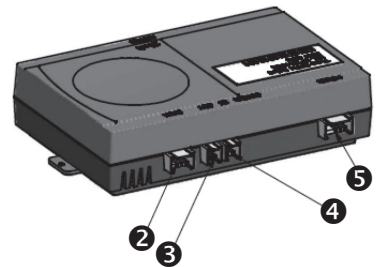
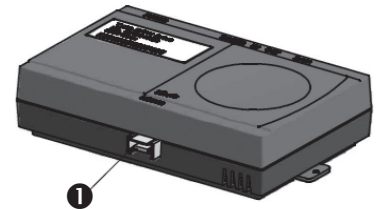
- One control for all BFPM motor pumps
- Automatic recognition of connected BFPM motor pump
- Built-in diagnostics
- Programmable for specific applications
- PWM signal
- Suitable for connection to electronic compound

## Connections

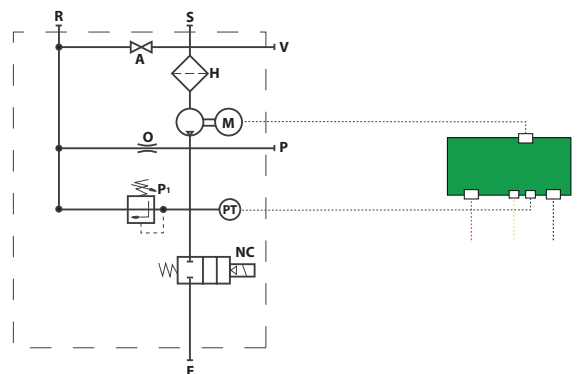
- 1 Motor cable
- 2 Signal cable
- 3 Transducer signal cable
- 4 Transducer cable
- 5 Power cable

Please notice:

- max. permitted cable length is 3000 mm.
- for EMC reason it might be necessary to add ferrite cores on the power supply cable and the motor cable.
- the controller must be mounted under a cover, where tools are needed to get access.



- P<sub>i</sub>: Pressure relief valve/regulator
- S: Suction inlet G1/4
- R: Return outlet G1/4
- E: Nozzle outlet G1/8
- P: Pressure gauge port G1/8
- V: Vacuum gauge port G1/8
- H: Filter
- PT: Pressure transmitter
- O: Constriction
- A: 2-pipe screw



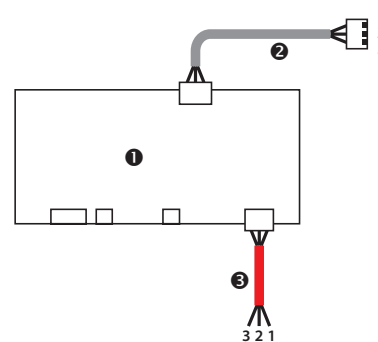
## Technical Data

Safety	Galvanic isolated from high voltage side (supply voltage and motor) to signal side
Humidity	Below 95% r.h. (non-condensing)
Lifetime	Min. 10 years operating, equal to 20,000 hours
Operating temperatures	0 to 60° C
Storage temperature	-20 to 60° C
TÜV approval	According to EN/IEC 60335-1

Operating Mode

Fixed Speed

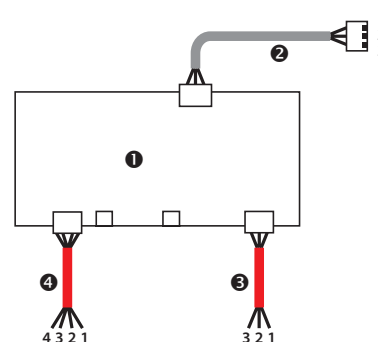
- ❶ Motor control box (MCB)
- ❷ Motor cable
- ❸ Power cable from Burner Control Box (BCB)



Cable	Terminal	Colour	Type	Line	Description	Function	Remarks
Power ❸	1	brown	Input	L	230 V, 50 Hz	Power supply	From Burner Control Box (BCB)
	2	yellow/green		PE	Protection		
	3	blue		N	0		
Motor ❷	1	brown	Internal	W	230 VAC	Motor power supply and drive	
	2	blue		V			
	3	black		U			

Variable Speed

- ❶ Motor control box (MCB)
- ❷ Motor cable
- ❸ Power cable from Electronic Control Box (ECB)
- ❹ Control signal cable from Electronic Control Box (ECB)

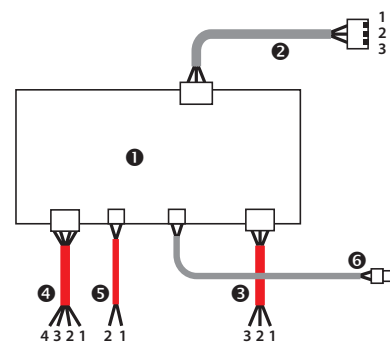


Cable	Terminal	Colour	Type	Line	Description	Function	Remarks
Control signal ❹	1	white	input	+	4-12 VDC, 50 Hz PWM	Set point speed	Optocoupled, galvanic isolated
	2	yellow		-			
	3	green	output	+	Open collector, 50 Hz PWM	Feedback speed	Optocoupled*, RS 220 Ω, <25 mA
	4	brown		-			
Power ❸	1	brown	Input	L	230 V, 50 Hz	Power supply	From Electronic Control Box (ECB)
	2	yellow/green		PE	Protection		
	3	blue		N	0		
Motor ❷	1	brown	Internal	W	230 VAC	Motor power supply and drive	
	2	blue		V			
	3	black		U			

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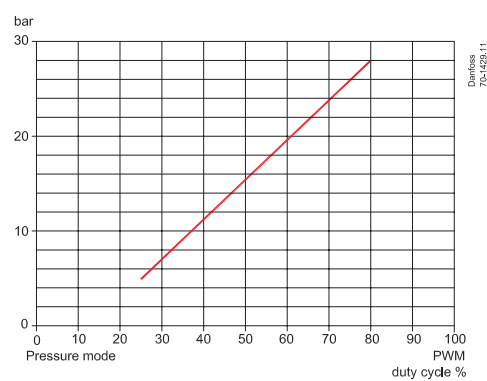
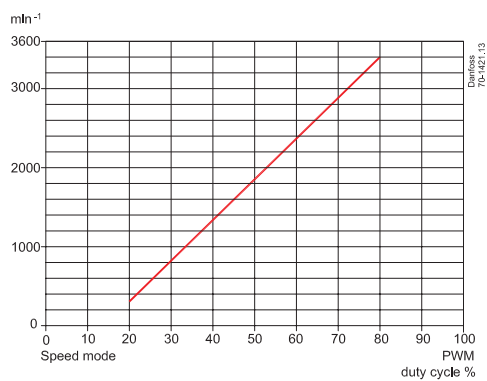
Pressure Modulation

- ❶ Motor control box (MCB)
- ❷ Motor cable
- ❸ Power cable from Electronic Control Box (ECB)
- ❹ Control signal cable from Electronic Control Box (ECB)
- ❺ Transducer signal cable from Electronic Control Box (ECB)
- ❻ Transducer cable



Cable	Terminal	Colour	Type	Line	Description	Function	Remarks
Control signal ❹	1	white	input	+	4-12 VDC, 50 Hz PWM	Set point pressure	Optocoupled, galvanic isolated
	2	yellow		-			
	3	green	output	+	Open collector, 50 Hz PWM	Feedback speed	
	4	brown		-			
Transducer signal ❺	1	black	output	supply +	4-20 mA, max. 100 Ω	Transducer signal	Direct transducer signal
	2	red		supply -			
Power ❸	1	brown	Input	L	230 V, 50 Hz	Power supply	From Electronic Control Box (ECB)
	2	yellow/green		PE	Protection		
	3	blue		N	0		
Transducer ❻	1	yellow	Internal	supply +	9-28 V	Pressure measurement	0-28 bar, 4-20 mA, galvanic isolated
	2	blue		supply -			
Motor ❷	1	brown	Internal	W	230 VAC	Motor power supply and drive	
	2	blue		V			
	3	black		U			

\*SFH 6156-3



Note! Fix speed mode 2800 min<sup>-1</sup>

**Diagnostics**

The BFPM status is indicated by green, yellow and red LED's: ● = LED off, ○ = LED on (●/○= 250 ms)

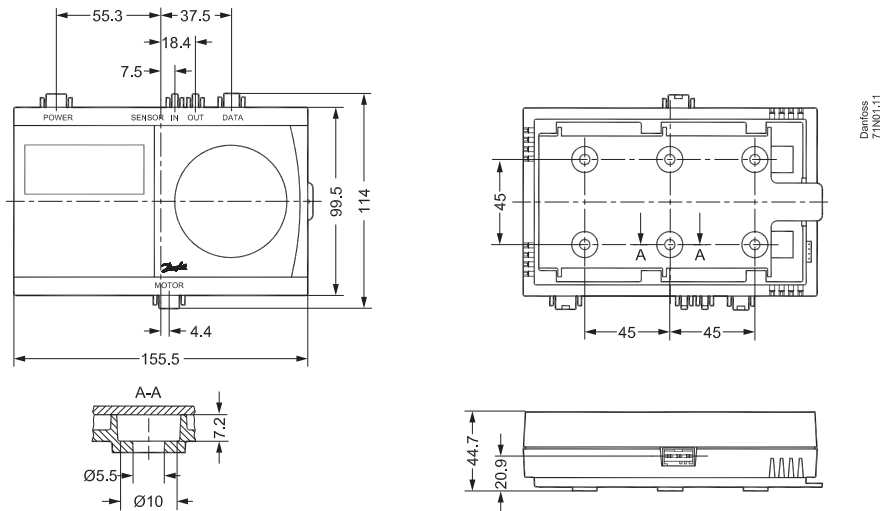
*Note! The LED's are placed under the cover.*

*Warning! 230 V on print circuit board.*

	Green (power)	Yellow (motor OFF/motor ON)	Red (error)
Power OFF	●●●●●●●●	●●●●●●●●... / ●●●●●●●●...	●●●●●●●●
Power ON	○○○○○○○○	○●●●○●●●... / ○●●○●●○●●...	see Error Indication

Error	Limits	Class B	Reaction	Error state	Output	Comment	Error indication
Under-voltage	<150 V	no	stop motor, restart > 160 V	1	25 Hz, 20% duty	Undervoltage	○●●●○●●●●●...
Motor overload		yes	stop motor, wait 10 sec., restart	2	25 Hz, 30% duty	Motor overload	○●●●●●●○●●●●...
Rotor blocked		yes	stop motor, 5 start attempts, wait 10 sec., restart	2	25 Hz, 30% duty	Pump defect	○●●●●●●○●●●●...
Wrong offset value	Offset value for current measurement circuit must be in allowed range of 35-51 mV	no	check before motor start (motor will not start if value is outside allowed range)	2	25 Hz, 30% duty	Stator failure	○●●●●●●○●●●●...
RAM failure		yes	stop motor, wait for power down	3	25 Hz, 40% duty	Failure in electronics	○●●○●●●●○●●○●...
ROM failure							
Register failure							
Stack failure							
CPU crystal failure							
Motor phase broken		yes	stop motor, wait for power down	4	25 Hz, 50% duty	Stator defect, check wiring	○●●○●●●●●●...
Pressure transducer	Pump running current ranges outside 3.5 mA > current < 23mA	yes	stop motor, wait for power down	5	25 Hz, 60% duty	Transducer signal failure	○●●○●●○●●●●●...
Pressure transducer initialisation	Current range outside 3.5 mA > current < 5mA	yes	stop motor, wait for power down	5	25 Hz, 60% duty	Transducer defect / wiring problem	○●●○●●○●●●●●...
PWM input failure	< 47 Hz or > 53 Hz, < 10% or > 90% duty	yes	stop motor, wait for power down	6	25 Hz, 70% duty	If missing PWM signal, stop motor and wait for PWM burner control to start. PWM input signal failure.	○●●○●●○●●○●●●●...

**Dimensions**



Additional documentation on burner components is available on <http://heating.danfoss.com/>

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