DUCA®

Energy Saving

APM-T High Efficiency Pump

APM-T Technical Specification

www.ducapump.com

Application

For domestic hot water system such as mix water underfloor heating system, air energy hot water circulation system, solar hot water circulation system and family hot, cold water pressurization circulation, etc.

Main features

- EEI≤0.21(4/6T≤0.20)
- Permanent magnet plastic injection motor, intelligent frequency control
- Compact size, easy for installation
- Proportional pressure mode
- Constant pressure mode
- Constant speed mode
- AUTO adapt mode
- PWM external control optional
- Visualized operation

Working condition

- Liquid temperature：2℃～110℃
- Ambient temperature：+40℃
- Max system pressure：10bar
- Protection level：IP44
- Rated voltage/frequency：220V～240V, 50/60Hz
- Insulation class：F
- Pumped liquid characteristics: clean liquid, free from solids and mineral oils, non-toxic, chemically neutral, close to the characteristics of water
- Installation: the motor shaft must be kept in horizontal direction

Pumped liquid

- Heating water
- Glycol solution with density ≤50%

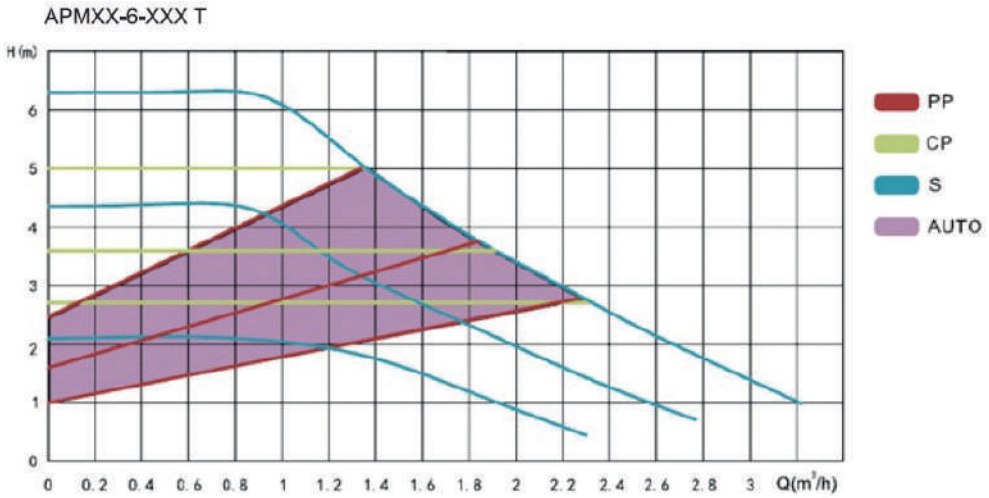
Technical data

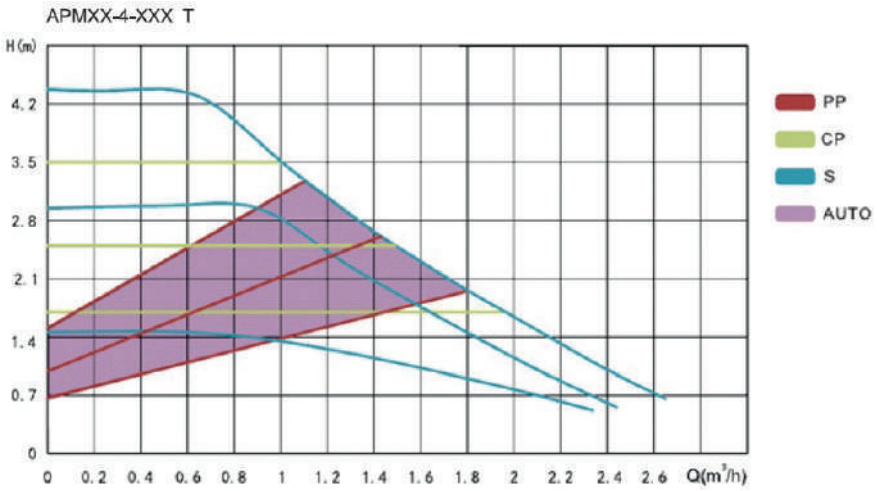
Parameter	Data
Pump type	Centrifugal circulating pump (non-self-priming)
Single-phase power supply (AC/DC)	AC
Voltage	220～240V
Frequency	50/60Hz
Max input power	65W
Standard	IEC 60038
IP class	IP44
Insulation class	Class F
EEI	≤0.21
Max head	8m
Max flow	$4m^3/h$
Pipe size	DN20 DN25 DN32
Inlet&outlet union size	G1 G1.5 G2
Pump efficiency	40%
Insulation resistance	Cold≥100MΩ；Hot≥5MΩ
Temperature rise	≤70K
Ambient temperature	0～40℃
Liquid temperature	2～110℃
Storage temperature	-35～80℃
Max system pressure	1.0Mpa (10bar)
Rotation	Clockwise seeing form the control box

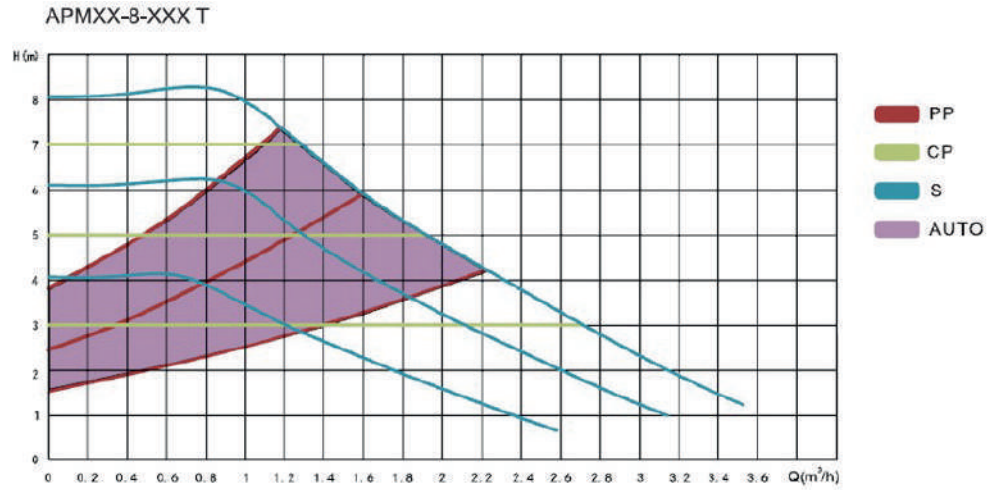
Functions for different model

Model	Internal control			External control
	P P	C P	C S	PWM
APM XX - X – XXX T	I	I	I	PWM1
	II	II	II	
	III	III	III	
	AUTO	/	/	

Performance curve







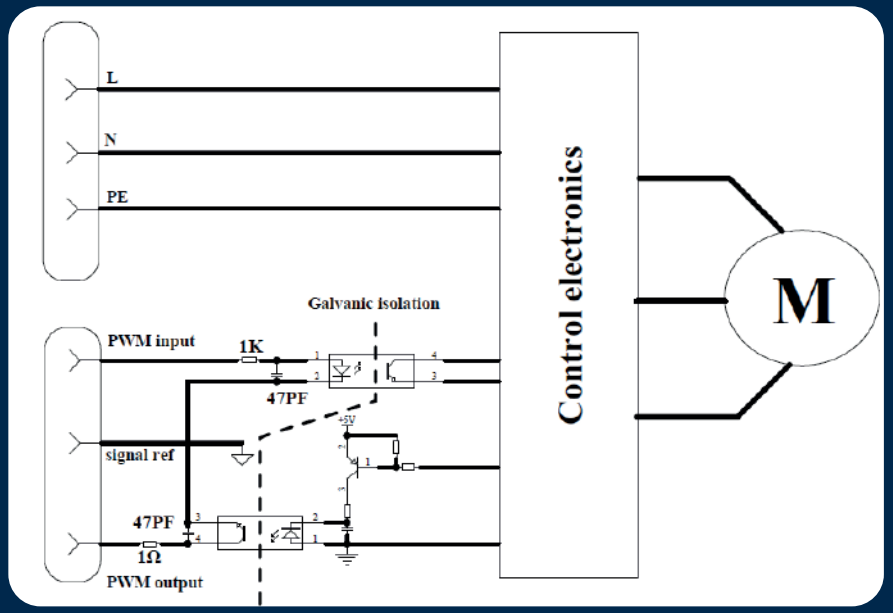
Electrical and hydraulic data

Model	Inlet/ Outlet	Unions	Max Flow	Head range	Voltage	Frequency	P1	In
	mm		m^3/h	m	V	Hz	W	A
APM20-4-130T	20	G1	2.2	1～4	220～240	50/60	25	0.3
APM25-4-130T	25	G1.5	2.5					
APM25-4-180T	25	G1.5	2.5					
APM32-4-180T	32	G2	2.9					
APM20-6-130T	20	G1	2.4	1～6			40	0.5
APM25-6-130T	25	G1.5	3.2					
APM25-6-180T	25	G1.5	3.2					
APM32-6-180T	32	G2	3.6					
APM20-8-130T	20	G1	2.9	1～8			65	0.65
APM25-8-130T	25	G1.5	3.4					
APM25-8-180T	25	G1.5	3.6					
APM32-8-180T	32	G2	4.0					

PWM

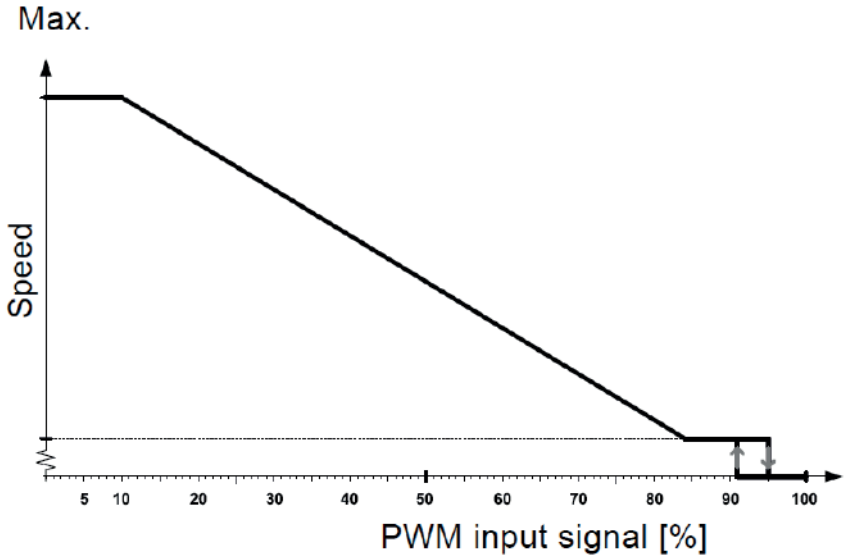
Basic control principles

When PWM signal is connected, the operation of circulating pump is controlled by PWM signal. If there is no PWM signal, the operation of circulating pump is controlled by internal control logic.



PWM input signal (P1 heating)

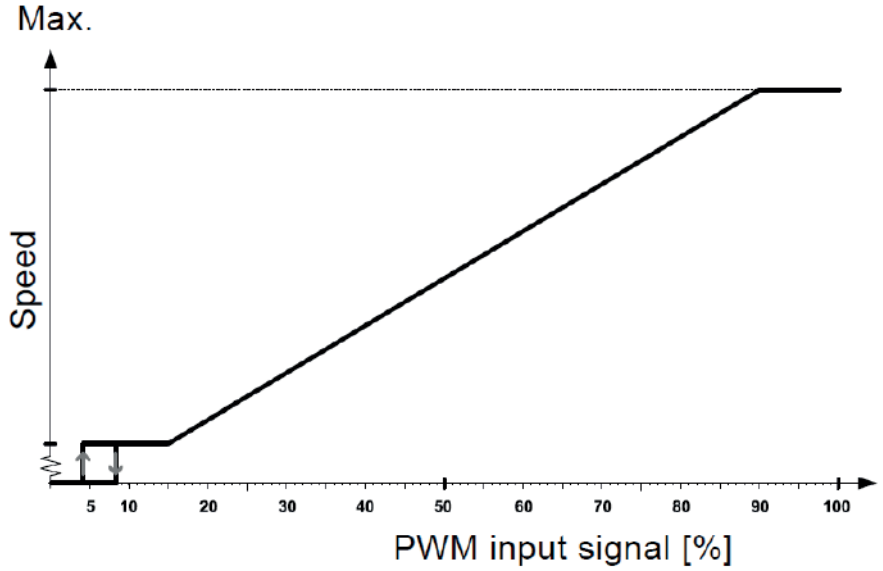
At high PWM signal percentages (duty cycles), a hysteresis prevents the circulating pump form starting and stopping if the input signal fluctuates around the shifting point. At low PWM signal percentages, the circulating pump speed is high for safety reasons. In case of a cable breakage in a gas boiler system, the circulating pump will continue to run at maximum speed to transfer heat from the primary heat exchanger. This is also suitable for heat circulating pumps to ensure that the circulating pump can transfer heat in case of a cable breakage.



PWM input signal (%)	Pump status
PWM=0	Switch the pump to non-PWM mode (internal control) operation
0<PWM≤5	Maximum speed: Max.
5<PWM≤85	Variable speed: max. to min.
85<PWM≤93	Minimum speed: Min
85<PWM≤88	Hysteresis area: on/off
94<PWM≤100	Standby mode: off

PWM input signal (P2 solar)

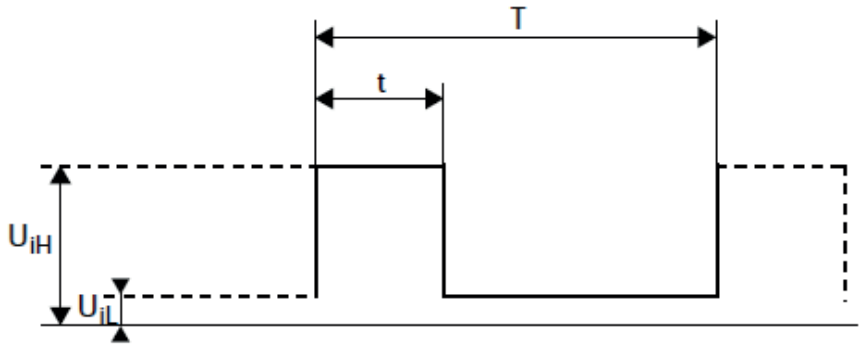
At low PWM signal percentages (duty cycles), a hysteresis prevents the circulating pump form starting and stopping if the input signal fluctuates around the shifting point. Without PWM signal percentages, the circulating pump will stop for safety reasons. If a signal missing, for example due to a cable breakage, the circulating pump will stop avoid overheating of the solar thermal system.



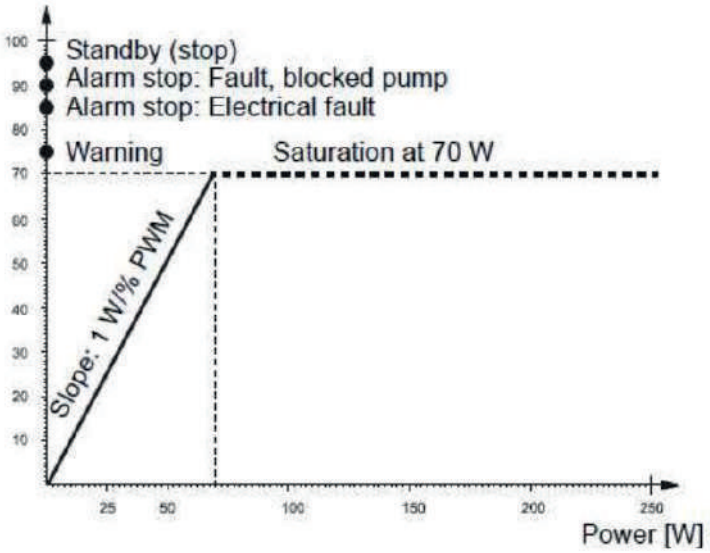
PWM input signal (%)	Pump status
PWM=0	Stop running
0<PWM≤5	Standby mode: off
5<PWM≤8	Hysteresis area: on/off
8<PWM≤15	Minimum speed: Min
15<PWM≤90	Variable speed: min. to max.
90<PWM≤100	Maximum speed: Max.

PWM Signals

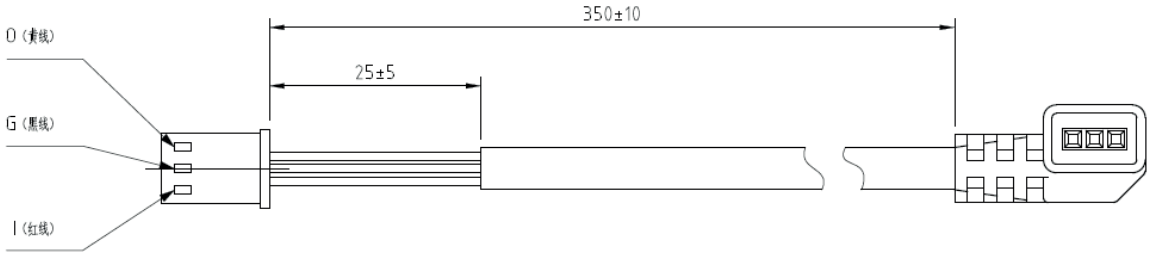
Optocoupler isolation		YES
PWM input frequency		100—5000Hz
High-level input voltage	UiH	3.3—24V
Low-level input voltage	UiL	＜0.7V
High-level input current	IH	3.5mA—10mA
PWM output duty cycle		0—100%
Signal polarity		fixed
Length of signal line		＜3m
Rising and falling edge time		＜T/1000



PWM feedback signal (power consumption)



Signal connection



Black: Ground wire (GND)

Red: PWM input (from controller)

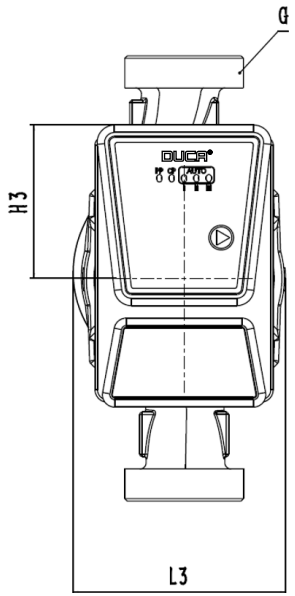
Yellow: PWM output (from the pump)

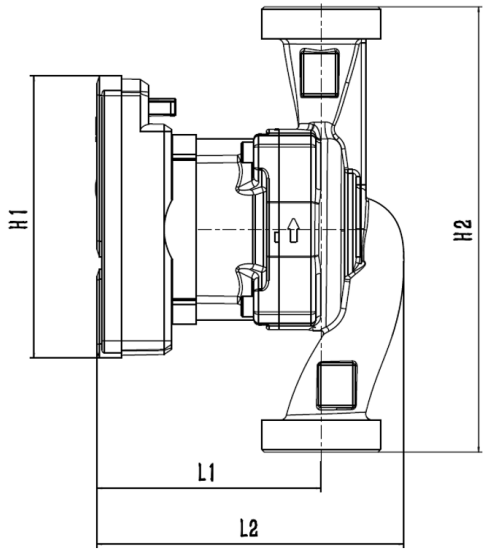
PWM output signal (%)	Qualification time QT (s)	Pump information	Disqualification time DT (s)	Priority
95	0	Standby by PWM signal (STOP)	0	1
90	30	Alarm, stop, blocked error	12	2
85	0-30	Alarm, stop, electrical error	1-12	3
75	0	Warning	0	5
0-70		0—70W (slope 1W/%PWM)		
Output frequency	75Hz+/-5%			

PWM output (%)	Qualification time QT (s)	Pump information	Disqualification time DT (s)	Priority
100	0	Standby by PWM signal (STOP)	0	1
95	0—60	Alarm/Stop/Block Error (locked rotor/dry run,stop)	0—600	2
90	0—30	Alarm/stop/electrical error (phase loss/overcurrent, stop)	1-5	3
85	0	Warning (under/over voltage, stop)	0	4
80	0	Warning (160-194V, the pump has low working efficiency, the power feedback accuracy is abnormal, but the pump still runs)	0	5
5-75	0	The pump is running normally, feedback 0—4.5m^3/h flow information	0	7
2	0	Standby, hysteresis point waiting to run	0	6
0	0	PWM signal interruption (maximum power operation)	0	8
Output frequency	75Hz+/-5%			

NO	Main components
1	Pump body
2	Impeller
3	Pump cover assembly
4	Sealing ring
5	Thrust bearing block
6	Rotor assembly

NO	Main components
7	Flat sealing I
8	Rotor can assembly
9	Motor
10	Nuts
11	Flat sealing II
12	Control box assembly





Model	Size (mm)								Inner box (kg)		Outer box		
	L1	L2	L3	H1	H2	H3	G	Unions	NW	GW	Pcs/ carton	Size (mm)	GW (kg)
APM20-4-130T	93	126	86	114	130	62	G1	G1 to G3/4	1.4	1.8	8	360× 290× 200	16
APM20-6-130T													
APM20-8-130T													
APM25-4-130T							G1 1/2	G1 1/2 to G1	1.5	2.0			17
APM25-6-130T													
APM25-8-130T													
APM25-4-180T					180				1.7	2.2		420× 280× 210	15.5
APM25-6-180T													
APM25-8-180T													
APM32-4-180T							G2	G2 to G1 1/4	1.8	2.5			21
APM32-6-180T													
APM32-8-180T													

Standards

EN 60335	Yes
EN 60335-2-51	Yes
2006/95/EC	Yes
EN 61008-3	Yes
EN 61000-6-1	Yes
EN 61000-6-2	Yes
EN 61000-6-3	Yes
EN 61000-6-4	Yes

Certification

- RoHs
- CE
- EEI (APM-4/6T≤0.20; APM-8T≤0.21)