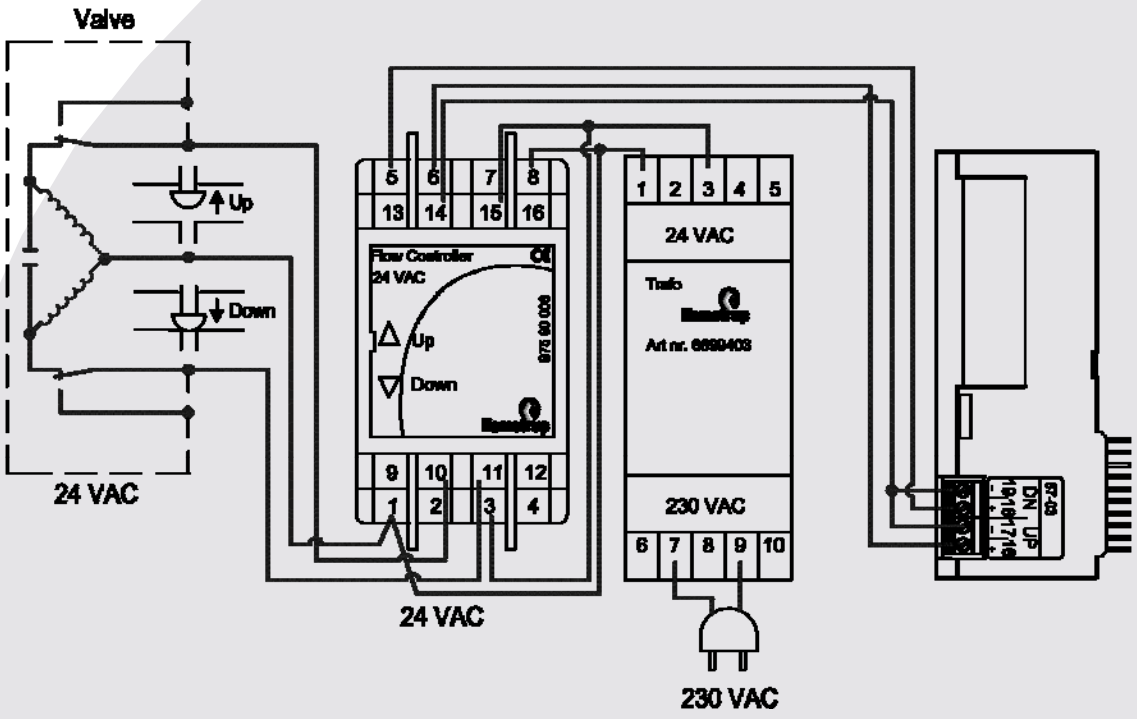
Installation Guide

PQT-Controller MULTICAL® 601



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1 Introduction

MULTICAL®601 can control a motor-operated valve for projects, where power and/ore flow control is required (top module 67-03). Further more the temperatures ΔT and T2 can be added as additional control features. The limitation is based on the power, flow and temperature limits programmed into the calculator.

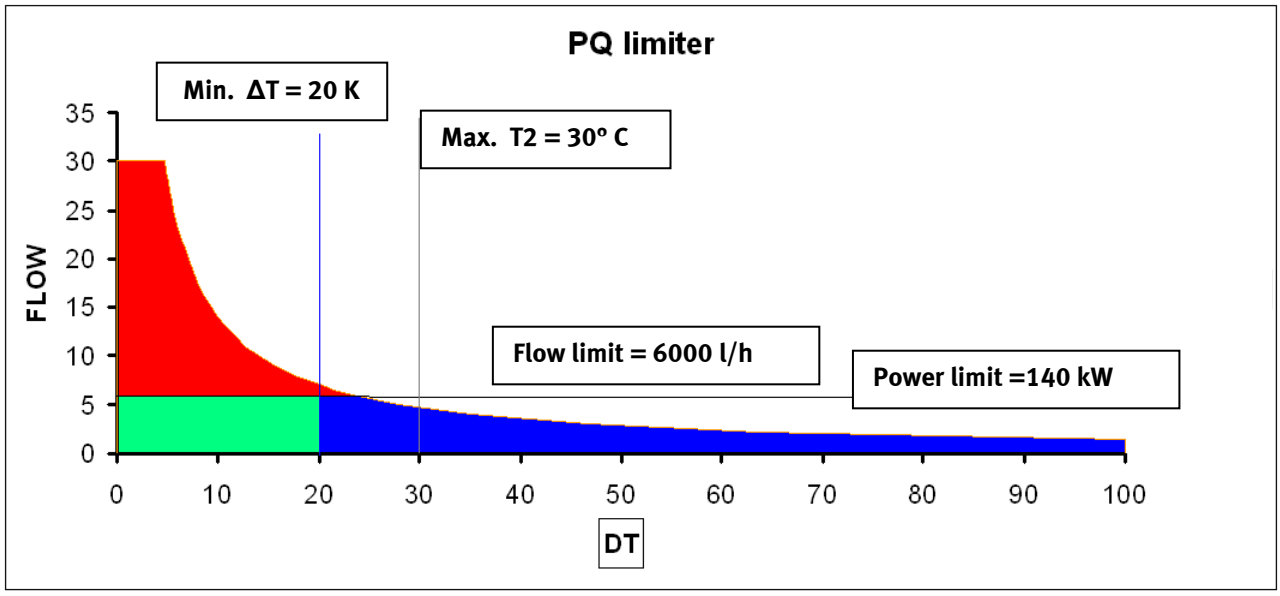
These parameters are entered by use of the PC-software METERTOOL MULTICAL®601 (type 6699704).

It is necessary to mount a Kamstrup Flow Controller and top module 67-03) to be able to use the PQT-controller function. The limitation function is in the top module not the meter.

The pulse outputs are used to control the motor-operated valve.

2 Function

PQT controller function ensures that the limits are not exceeded.



From above chart it shows how the PQT controller ensures that the limit of e.g. 140 kW is not exceeded. At low cooling (e.g. below 20 K), the controller function ensures that a limit of e.g. l/his not exceeded.

As additional parameters further regulation can be carried out by minimum ΔT and maximum T2, if these limits are exceeded the system will reduce flow and force a higher ΔT and/or lower T2. To assure that the regulation functionality ΔT and T2 regulation is only active above a programmable minimum flow. If the flow drops below this value the system will ignore the ΔT and T2 functions.

If only power control is required, the flow limit q is marked" Deactivated" and if only flow control is required the power limit is" Deactivated".

If no ΔT function is required the limit is marked "Deactivated" and if no T2 function is required the limit is marked "Deactivated".

"UP–COM–DN" output terminals are used as UP and DOWN control output for the motor-operated valve.

The control function requires a relative fast signal from the attached flow meter. Because of this mechanical flow meters with Reed-contact output (CCC=0XX) can not be used.

As the pulse outputs are only intended for electronically signal levels (low current and low voltage) a Kamstrup flow controller must be used when connecting the motor-operated valve.

3 Flow Controller and valve specification

Flow Controller Type nr. S7590006

Technical data of the Flow Controller:

Relay type:	Solid State, galvanic isolated.
Supply power (8-15):	24 VAC
Motor voltage (1-3):	24 VAC
Motor current (1-10-11):	< 1.0 A
Mutual blockage:	must be included

The motor-operated valve must have total valve traction of between 120…460 sec.

If a motor-operated valve has a spindle velocity of 10 sec./mm and the matching valve has a spindle drift of 25 mm, the total valve traction will be 250 sec.

Faster motor-operated valves with spindle velocity of e.g. 1…3 sec./mm are generally not suitable for heat systems, and cannot be used in relation with the MULTICAL®601.

At delivery the regulation parameters are setup to default (please see screen dump at next page). When the PQT controller is put into operation the parameters can be changed by use of METERTOOL for MULTICAL® 601.

3.1 General data

Control function:	3-position contact function
Motor-operated valve:	24 VAC
Characteristics:	Linear
Valve traction:	120….460 sec.

3.2 Dynamic range

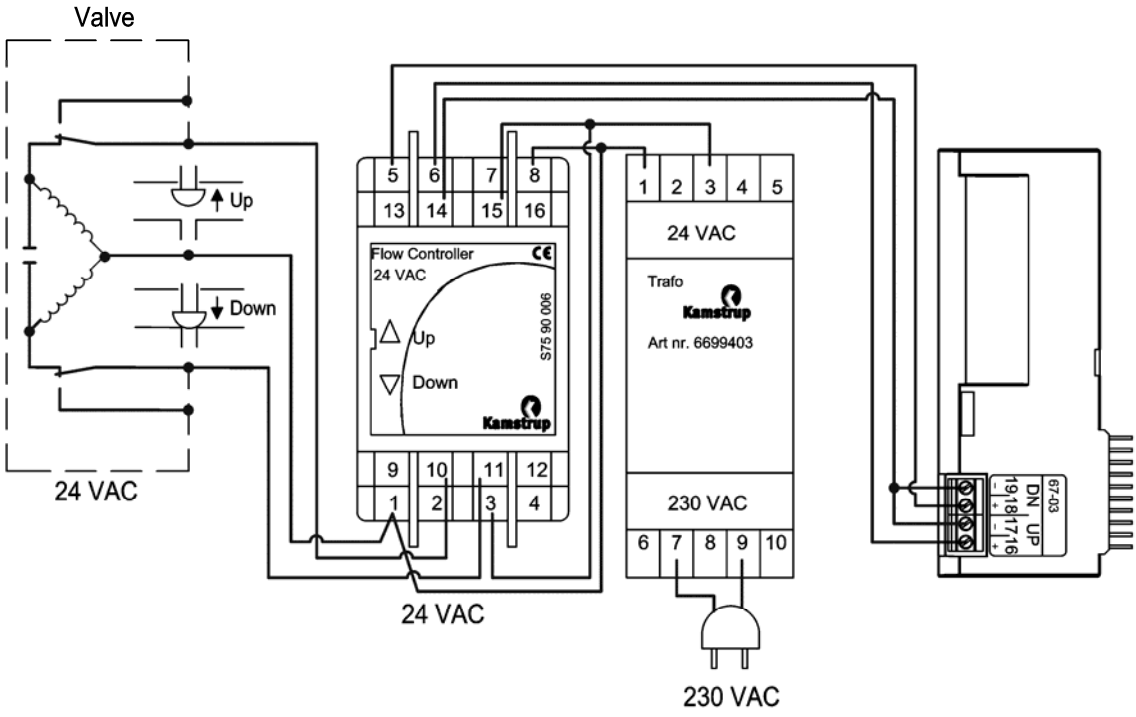
Power:	ps…ps/10(100…10%)
Flow:	qs…qs/50(100…..2%)

4 Installations diagram

4.1 Installations diagram:

NB! Below installation only relates to the 24 VAC Flow Controllers.

Installations chart for 24 VAC Flow Controller and 24 VAC valve motor:



4.2 Testing the installation:

The flow controller and the motor valve function can be tested:

1. Connect supply power.
2. Short-circuit the terminals 16 and 17 at the top module by means of a small piece of insulated wire. The ”UP” – arrow at the Flow controller will light, and the motor valve must operate until the valve has opened.
3. Short-circuit the terminals 18 and 19 at the top module by means of a small piece of insulated wire. The ”DOWN” – arrow at the Flow controller will light, and the motor valve must operate until the valve has closed.
4. When this simple test works as described, the UP/DOWN control is operating correctly.

5 Operation

5.1 Operation by METERTOOL

To use then PQT-controller function the meter/top module must be programmed with the limit and valve parameters.

The programming is done by using METERTOOL for MULTICAL®601 and optical head. All necessary data can be programmed without need of reverification.

Place the optical head at the MULTICAL®601 and open the METERTOOL for MULTICAL®601 program. Activate ”Features” and select ”PQT Limiter”. Activate ”Read” and readout the current limit and valve parameters.

Meter settings
Flow meter qp size:

General settings
Valve parameters

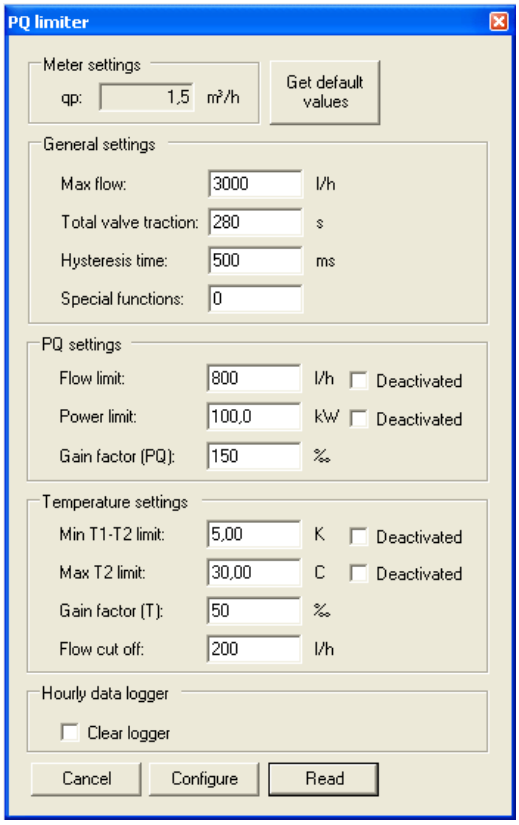
(Max flow = 2 x qp):

PQ settings
Limit data, flow and/or power:

Gain result in faster regulation, but more overshooting.

Temperature settings
Limit data, temperatures:

Hourly data logger
Reset ”Hourly data logger”



“Deactivated” means that the function is not in operation.

Key in the changes required and activate ”Configure” and the new data is transferred to the MULTICAL® 601 top module.

NB! When parameters (limits) are changed the controller assume the valve to be fully open.

This have no influence when parameters are reduced (lower), the control will continue normal operation.

But if parameters are raised (higher) this result in a slow operation toward the new parameters.

This can be compensated by forcing the valve to fully open position.

6 Trouble shooting

Symptom	**Possible cause**	**Suggestion for correction**
The motor valve remains totally closed and the "UP" light-emitting diode (LED) constantly lights.	The "UP" and "DOWN" connections have been switched.	Switch the connections.
The valve function is not working after reprogramming MULTICAL®	During "Total programming with METERTOOL" the "PQT-Controller data" is deleted. Regulation parameters and valve data is only stored in the Top module 6703. The "PQT-Controller data" must be reprogrammed.	Enter new data by use of METERTOOL.
The motor valve responds too slowly in connection with flow or power peaks	The regulating parameters do not fit the valve	Enter new "PQT-Controller data" by means of METERTOOL. If the response is too slow the running time (Total Traction) typically must be raised.
The motor valve is unstable, does not stabilize.	The regulation parameters does not fit the valve	Enter new "PQT-Controller data" by means of. In connection with "hunting" the running time (Total Traction) must typically be reduced.
The "UP" and "DOWN" of the controller are functioning, but the valve is not running.	The valve is at a limit stop	Adjust the motor valve limit stop (refer to valve documentation)
The "UP" and "DOWN" of the controller are functioning, but the valve is not running.	The controller is out of step due to changes in the parameter	Re-set the controller by disconnecting the voltage to the controller for 30 sec. Check the voltages to the valve (perhaps the valve is defective).
The motor valve responds too slowly	The working area is too low compared to the installation. E.g. if the limit should be set at 10% or less of the dynamic range.	Make sure that the installation is dimensioned correctly.
The motor valve responds too slowly (lack of accuracy)	Hysteresis is set too high, and thus the motor valve is not running so often (less wear) on account of the accuracy in the regulation.	Enter new hysteresis, in practice rarely more than 0.5-1 sec.

NB!! **Remember that in connection with closed valve motor, a minimum flow must be present to prevent frost bursts.**