

# **PQ Controller Installation Guide**

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## Introduction

MULTICAL<sup>®</sup> 66-C can control a motor-operated valve for projects, where power and/or flow control is required (Tariff E=A). The control is based on the power and flow limits which have been set as TL2 = power limit value and TL3 = flow limit value.

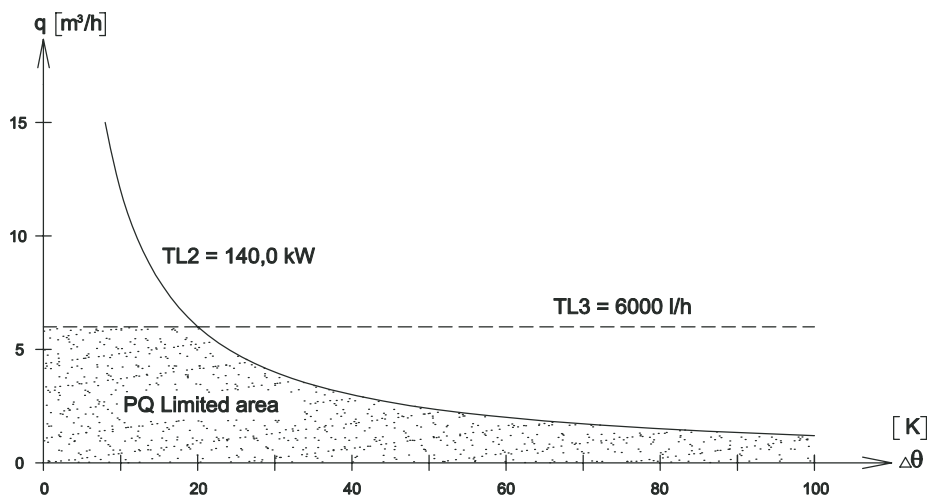
These parameters are entered via Kamstrup's MULTITERM or the PC software METERTOOL. In order to use the PQ controller function it is necessary to install a Kamstrup Flow Controller and one of following modules:

Data/pulse outputs  
Telephone modem/pulse outputs  
M-Bus/pulse outputs

as the pulse outputs are used for controlling the motor-operated valve.

## Function

The PQ controller function ensures that the limits are not exceeded.



From above chart it appears how the PC controller ensures that a power limit of e.g. 140 kW is not exceeded. In connection with low cooling (e.g. below 20 K), the controller function ensures that a flow limit of e.g. 6000 l/h is not exceeded.

If only a power limit value is required, the flow limit value, TL3, is set to the max. area  $q_s$  of the flow meter and vice versa if only a flow limit value is required. When tariff type E=A is selected the pulse outputs of CE and CV are used as UP and DOWN control outputs for a motor-operated valve.

The control function requires a relatively fast signal from the flow meter, which is why mechanical flow meters with Reed switch outputs (CCC=0XX) cannot be used. In addition, CONFIG FF and GG must be set to "outputs" (FF=GG=00).

As the pulse outputs are only intended for electric signal levels (small currents and voltages) a Kamstrup Flow Controller module must be used when connecting the motor-operated valve.

## Valve specification

The motor-operated valve must have a total valve drift of 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 drift will be 250 sec.

Faster motor-operated valves with spindle velocities of e.g. 1...3 sec./mm are generally not suitable for heat systems, and cannot be used together with MULTICAL® 66-C.

When delivered the regulation parameters are set to qp/180 sec. When the PQ Controller is put into operation, the parameters can be changed by using MULTITERM or METERTOOL.

### General data

Control function:	3-point contact function
Motor-operated valve:	24 VAC
Characteristics:	Linear
Valve drift:	120...460 sec.

### Dynamic range

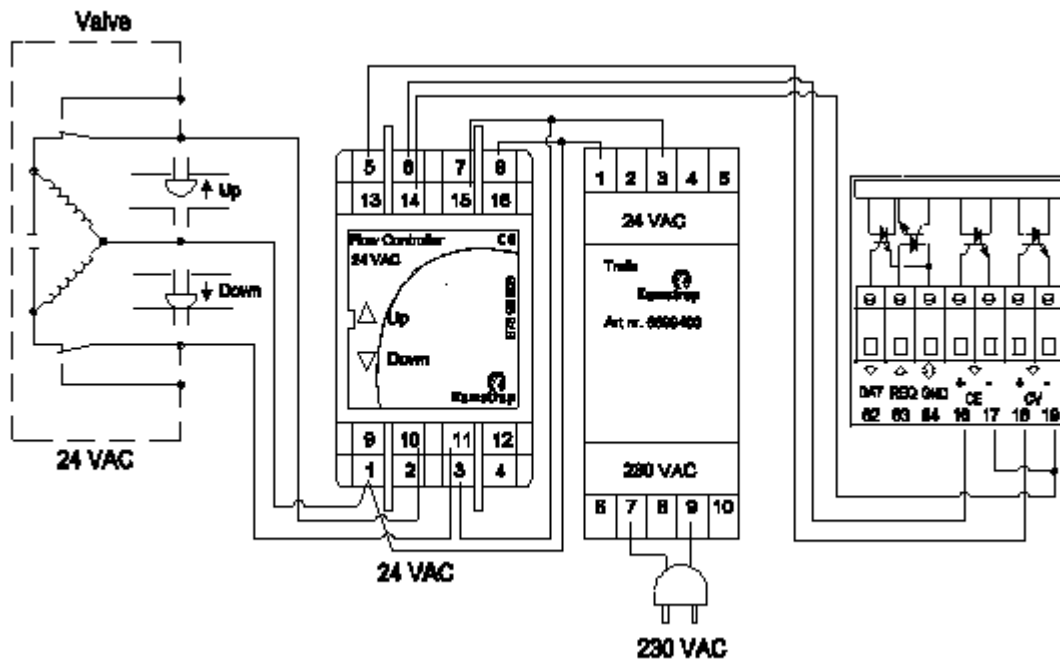
Power:	ps...ps/10(100...10%)
Flow:	qs...qs/50(100.....2%)

## Installation : 24 VAC

### Installation charts:

Below installation *only* relates to the 24 VAC Flow Controller.

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



### Installation test guide

#### The Flow Controller and the motor valve can be tested:

1. Connect supply power.
2. Short-circuit terminal 16 and 17 on the MULTICAL<sup>®</sup> bottom print by means of a small piece of insulated wire, and the "UP" arrow on the Flow Controller will light, and the motor valve must operated until the valve has opened.

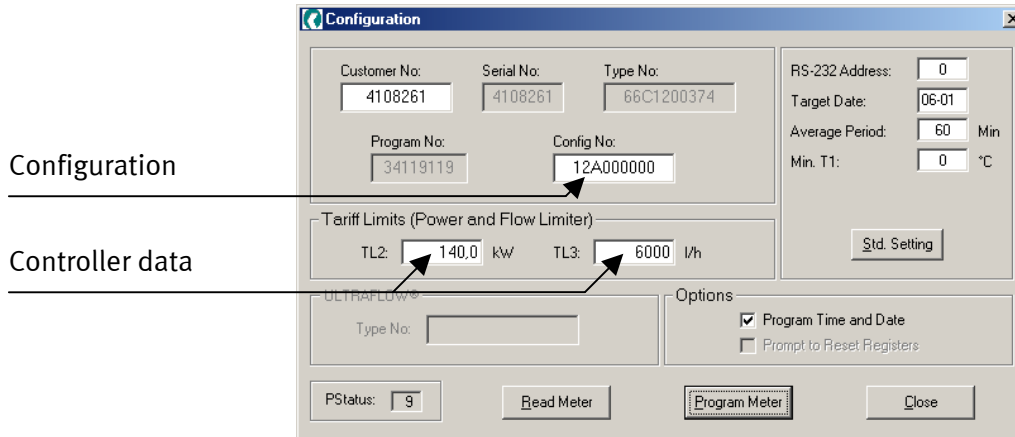
Short-circuit terminal 18 and 19 on the MULTICAL<sup>®</sup> bottom print by means of a small piece of insulated wire, and the "DOWN" arrow on the Flow Controller should now light, and the motor valve must operated till the valve has closed.

When this simple test works as described, the up/down control is operating perfectly.

# Putting the controller into operation

## Putting the controller into operation by using METERTOOL

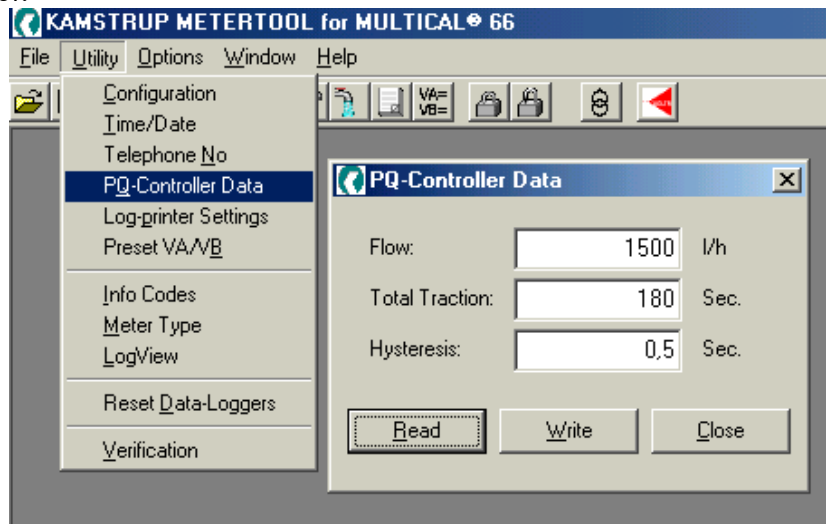
To use the PQ controller function the meter must be programmed with the correct configuration, controller data and valve parameters. This is done by means of METERTOOL. All necessary data can be keyed in without further needs of reverification.



Configuration: DD-E-FF-GG-M-N should be XX-A-00-00-X-X, where X is independent data.

Controller data: Then the required limit(s) for Power (TL2) and/or Flow (TL3) are entered. If only an effect limit value is required, the flow limit value TL3 is set to the max. area qs of the flow meter and vice versa if only a flow limit value is required.

Then the "Program Meter" menu is activated and configuration and controller data are transferred to the MULTICAL® 66-C calculator.



Valve data: The path: "Utility"....."PQ-Controller Data" is activated and flow meter size, valve drift and valve hysteresis are entered. In practise, hysteresis is max. 0.5 – 1 sec.

Then "Write" is activated and data will be transferred to the MULTICAL® 66-C calculator.

## Putting the controller into operation by using MULTITERM

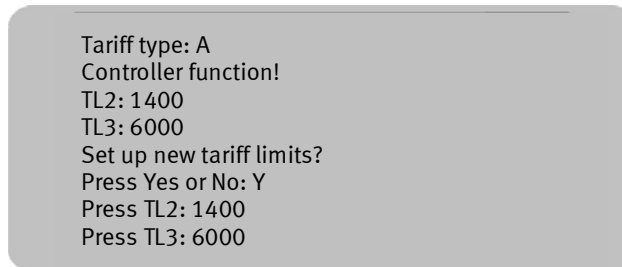
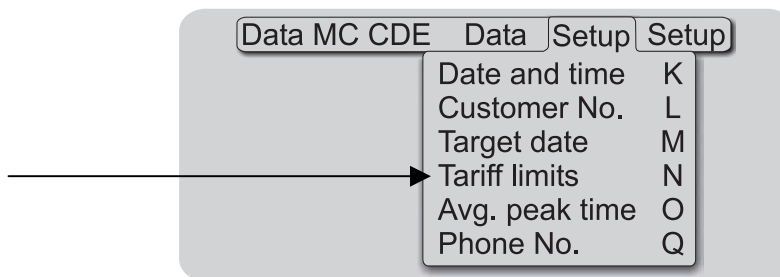
Putting the controller into operation by means of MULTITERM WorkAbout requires correct configuration. This might be entered in advance either at Kamstrup A/S or previously by means of METERTOOL.

If this is not the case, there is no access to programming the controller data.

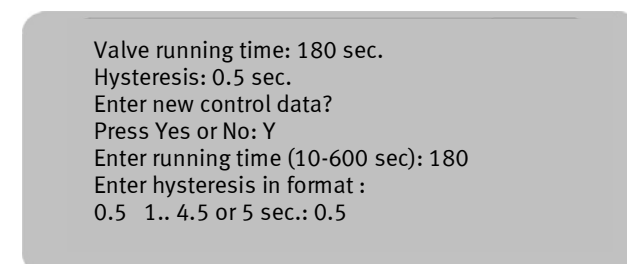
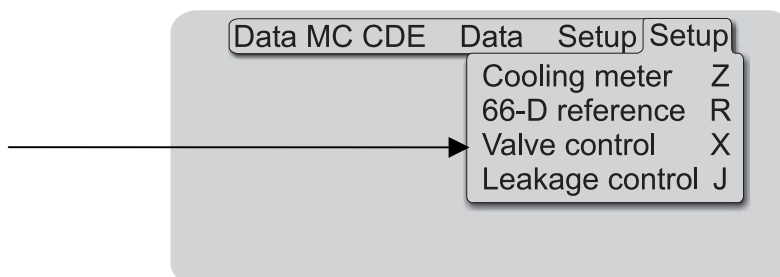
Controller data: In the WorkAbout main menu, the menu 4 is selected: Read/prog. MULTICAL<sup>®</sup> 66-CDE.

The controller data is entered under "Tariff limits".  
The power tariff is entered without a comma, but with the number of decimals prescribed in the current CCC code ( please refer to the Technical Description page 18-29 )

E.g.: CCC code 119 means that the limits TL2=140.0 kW and TL3=6000 l/h must be entered as TL2=1400 and TL3=6000.



Valve data: Valve data is entered under "Valve control", and here valve running time and hysteresis are entered.



## 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®	Under "Total programming with METERTOOL" the "PQ-Controller data" is deleted. MULTICAL is awaiting a Time-out before the new limits is set in operation.	Enter new data via METERTOOL or disconnect powersupply for 10 sec. Then reconnect power and the system starts regulating.
The motor valve responds too slowly in connection with flow or power peaks	The regulating parameters do not fit the valve	Enter new "PC-Controller data" by means of METERTOOL or a hand-held terminal. When the response is too slow the running time (Total Traction) is typically speeded up.
The motor valve is unstable, does not stabilise.	The regulation parameters does not fit the valve	Enter new "PQ-Controller data" by means of METERTOOL or hand-held terminal. 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.**