INSTRUCTIONS
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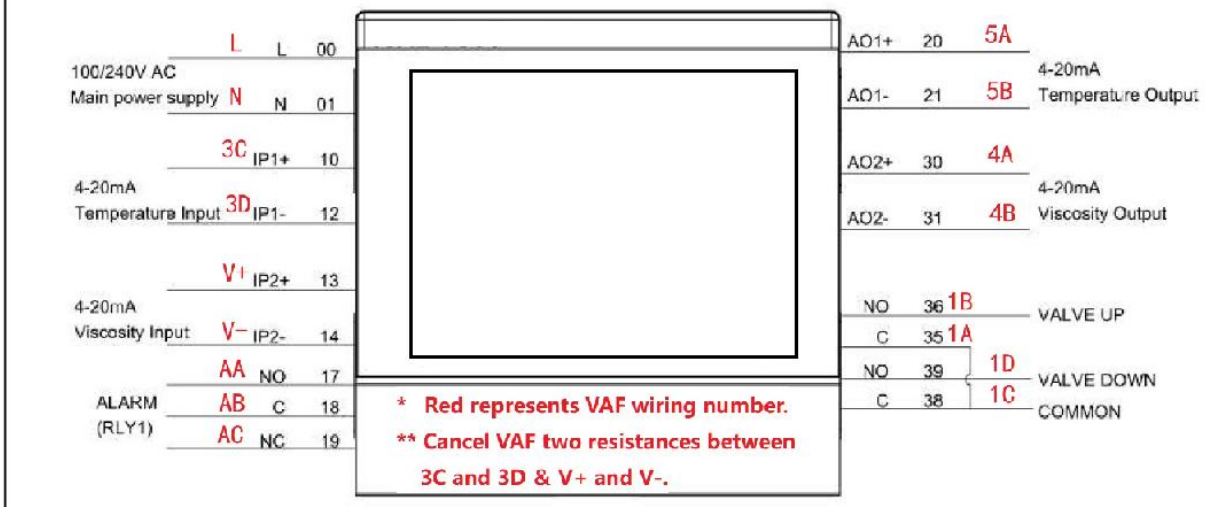
VISCOMASTER
FUEL VISCOSITY CONTROLLER
燃油粘度控制器

Instructions for installation, operation and maintenance

安装操作和维护指南

Shanghai A.K. Instruments Co., Ltd

上海洪柯自动化仪表有限公司



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1 PREFACE 前言

The electronic controller is available as an 1 channel and 2 channel controller.
控制器可以作为 1 通道 和 2 通道控制器。

This manual is based on a 2 channel controller with an analog output, since this type of controller is themost comprehensive.

本手册是基于 2 通道控制器并带有模拟输出，因为这类的控制器是最全面的。
This does not mean that this manual is not applicable for the other type of controller.
这并不意味着本 手册不适用于其它类型的控制器。

1.1 GENERAL 总则

This manual contains instructions for installation, operation and maintenance of the electronic controller. 本技术手册包括控制器的安装，操作及维护指南。
For installation, operation and maintenance information of associated equipment supplied by SHAKIC, refer to the separate manual supplied with those products.
对于其他辅助的 SHAKIC 产品设备，请参阅相应的产品技术手册。
This manual contains important information for the installer, the operator and for your maintenance department.
这本手册包含了所有安装调试，操作及维护人员所需要的重要资料与信息。

TO ENSURE SAFE AND CORRECT INSTALLATION AND HANDELING, OPERATION AND MAINTAINING, READ THIS MANUAL COMPLETELY BEFORE INSTALLING THE EQUIPMENT AND STARTING OPERATIONS.
为确保安全，正确的安装，搬运，操作和维护，在设备安装和开始操作前，请仔细阅读本手册。

For any additional information contact: 若需要更多资料及信息，请与 SHAKIC 联络:

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1.2 SYMBOLS 符号

The following symbols are used to call attention to specific types of information.
下列符号提示引起注意

A warning to use caution! In some instances, personal injury or damage to the Viscomaster unit or control system may result if these instructions are not followed properly.
小心警告！违规操作会导致人员伤亡或测量仪损坏。

An explanation or information of interest.
对相关情况的解释或注解

1.3 COPYRIGHT 版权

While every precaution has been taken in the preparation of this manual, no responsibility for errors or omissions is assumed. Neither is any liability assumed for damages resulting from the use of the information contained herein. Specifications can be changed without notice.
虽然我们在编撰出版本手册时已采取各种防范措施，但仍难免会出现误差等。我们对由此可能引起的损失不承担任何责任。同时我们有权随时更改本手册。

2 SYSTEM DESCRIPTION 系统描述

2.1 SYSTEM DESCRIPTION 系统概述

Viscosity control systems are intended for use in fuel oil treatment systems to obtain a correct measurement and control of the fuel oil viscosity.
燃油粘度控制系统应用于燃油处理系统以获得对燃油粘度的准确测量及控制。
Figure 1 shows a typical fuel treatment system with return line from the engine. In this system, the degassing/mixing tank operates as a fuel buffer, ensuring gradual changes of viscosity which results in a stable control of the viscosity. The Viscomaster sensor is used to measure the actual viscosity of the fuel oil. The signal from the sensor is compared to the setpoint of a viscosity controller, which regulates the output of the fuel heater via a control element (steam or thermal oil valve, or electric heater cabinet).
图 1 给出了一个典型的具有主机回流管路的燃油处理系统图。在该系统中，除去瓦斯/混油桶起到燃料缓冲器的作用以确保粘度渐变，从而获得对粘度的稳定控制。控制系统对粘度传感器发出的信号与控制器的设定值进行比较，通过控制元件[蒸汽，热油阀或电热器]以调节加热器的输出。

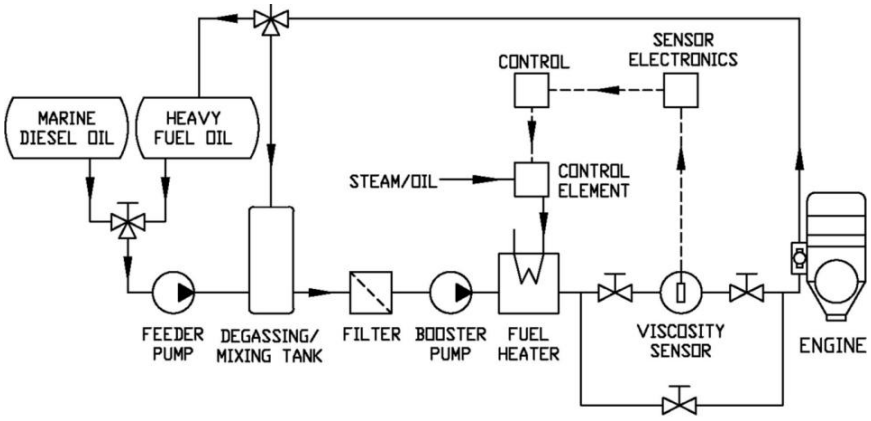


Figure 1 Typical example of an automatic control system using steam or thermal oil heater

Marine Diesel Oil	船用柴油	Heavy Fuel Oil	重燃油
Feeder Pump	供给泵	Degassing/Mixing Tank	除去瓦斯/混油桶
Filter	过滤器	Booster Pump	增压推进泵
Fuel Heater	燃油加热器	Steam/Oil	蒸汽/油
Control Element	控制元件	Control	粘度控制器
Viscosity Sensor	粘度探头	Sensor Electronics (Interface Box)	界面接口盒
Engine	发动机		

2.2 SYSTEM COMPONENTS 系统组成部分

The Fork viscosity system consists of: 音叉振动式粘度系统测量系统包括:

* the combined viscosity and temperature measuring sensor 粘度及温度测量传感器
* the sensor housing 传感器安放室
* Interface box 界面盒
* Electronic viscosity controller 控制器
* Control valve for steam (optional) 蒸汽控制阀

The viscosity controller is a microprocessor-based instrument with a proportional and integrating control action. It is available in two types (1 channel or 2 channels) to match the specific requirementsfor different viscosity control systems.
粘度控制器是一种基于微处理器的仪表，具有比例和积分控制作用。它有两种类型（1 个通道和 2 个通道），以满足不同粘度控制系统的特定要求。

Input signals for viscosity and temperature are normally 4-20 mA.
粘度和温度的输入信号均为 4-20mA。

Channel	Controller type	Controller output	Alarm	Retransmission output	Drawing No.
1	Viscosity (temperature read out)	RELAY	RELAY	Viscosity	3560-2111
1	Viscosity (temperature read out)	RELAY	RELAY	Viscosity＆temperature	3560-2112
2	Viscosity＆temperature	RELAY	RELAY	Viscosity	3560-2113
2	Viscosity＆temperature	RELAY	RELAY	Viscosity＆temperature	3560-2114
1	Viscosity (temperature read out)	Current 4-20 mA	RELAY	Viscosity＆temperature	3560-2115
2	Viscosity＆temperature	Current 4-20 mA	RELAY	Viscosity＆temperature	3560-2116

* One channel input, relay output，viscosity value retransmission.
一个通道输入，继电器输出，粘度信号输出。
Inputs for the controller are the signals for viscosity and temperature from the viscosity sensor electronics.控制器的输入是来自粘度传感器的粘度和温度信号。
The control action is based on the viscosity setpoint. The temperature value is only displayed.
控制动作是基于粘度设定值，温度用于显示。
The controller opens or closes the valve in the steam or thermal liquid line through two relay contacts.
控制器通过两个继电器触点开启或关闭蒸汽或热液管路中的阀门。
The viscosity value is retransmitted as an isolated active 4-20 mA output.
粘度被重传为隔离的有源 4-20mA 输出。

* One channel input, relay output, viscosity and temperature values retransmission.
一个通道输入，继电器输出，粘度和温度信号输出。
Inputs for the controller are the signals for viscosity and temperature from the viscosity sensor electronics.控制器的输入是来自粘度传感器的粘度和温度信号。
The control action is based on the viscosity setpoint. The temperature value is only displayed.
控制动作是基于粘度设定值，温度用于显示。
The controller opens or closes the valve in the steam or thermal liquid line through two relay contacts.
控制器通过两个继电器触点开启或关闭蒸汽或热液管路中的阀门。
Both viscosity and temperature values are retransmitted as isolated active 4-20 mA outputs.
粘度和温度被重传为隔离的有源 4-20mA 输出。

* Two channel input, relay output, viscosity value retransmission.
两个通道输入，继电器输出，粘度信号输出。
Inputs for the controller are the signals for viscosity and temperature from the viscosity sensor electronics.控制器的输入是来自粘度传感器的粘度和温度信号。
The control action is based on the viscosity or temperature setpoint.
控制动作是基于粘度设定值或温度设定值。
The controller opens or closes the valve in the steam or thermal liquid line through two relay contacts.
控制器通过两个继电器触点开启或关闭蒸汽或热液管路中的阀门。
The viscosity value is retransmitted as isolated active 4-20 mA output.
粘度被重传为隔离的有源 4-20mA 输出。

* Two channel input, relay output, viscosity and temperature values retransmission.
两个通道输入，继电器输出，粘度和温度信号输出。
Inputs for the controller are the signals for viscosity and temperature from the viscosity sensor electronics.控制器的输入是来自粘度传感器的粘度和温度信号。
The control action is based on the viscosity or temperature setpoint.
控制动作是基于粘度设定值或温度设定值。
The controller opens or closes the valve in the steam or thermal liquid line through two relay contacts.
控制器通过两个继电器触点开启或关闭蒸汽或热液管路中的阀门。
Both viscosity and temperature values are retransmitted as isolated active 4-20 mA outputs.
粘度和温度被重传为隔离的有源 4-20mA 输出。

3 TECHNICAL SPECIFICATION 技术规格

3.1 Operation 操作

Display 显示	3.5 inch TFT LCD, liquid cry stal display with built-in backlight. 3.5 TFT LCD，液晶显示带背光
Operator keypad 操作键	5 Tactile membrane keys. 5 个触觉膜按键

3.2 Physical 物理

Size 尺寸	96x96x112 mm
Weight 重量	0.8 kg approx.(unpacked)
Panel cutout 开孔尺寸	91.5x91.5mm
Case material 外壳材料	Glass-filled polycarbonate 玻璃填充聚碳酸酯

3.3 Environmental 环境

Operating temperature range 操作温度范围	0 to 55 ℃
Operation humidity range 操作湿度范围	5 to 95 %RH (non-condensing)
Storage temperature range 存储温度范围	-20 to 70 ℃
Enclosure sealing 外壳 IP 等级	Front face IP66 / NEMA 4X, Rest of enclosure IP20

3.4 Electrical 电气

Supply ranges 供应电源	100 to 240V AC ±10% 50 / 60Hz (85V MIN. TO 264V MAX.)
Power consumption 功耗	10W max.
Power interruption protection 电源中断保护	No effect for interrupts of up to 60 ms. 60 毫秒中断无影响

3.5 INPUT 输入信号

Number 数量	2
Type 信号类型	4-20mA
Update rate 更新率	125ms
Common mode noise rejection 共模噪声抑制正常模式噪声抑制	>120 dB at 50 / 60 Hz with 300 W imbalance resistance
Normal (series) mode noise rejection	>60 dB at 50 / 60 Hz
Long term (input) drift 长期输入漂移	<0.1 % of reading
Input impedance 输入阻抗	10 W (mA input)
Linear Inputs 4 to 20 mA	Standard Analog Input
Accuracy (% of reading)	0.2 % or ±4 μA Milliamps

3.6 OUTPUT 输出信号

Controls / Retransmission outputs 控制和重传输出	Analog 4 to 20 mA or Relay
Number 数量	2
Isolation 绝缘	Galvanically isolated from the rest of the circuitry 与电路其余部分绝缘
Load 负载	750 Ω Max.
Accuracy 精度	0.3 % of output
Relays Number 继电器数量	3
Controller and Alarm relay	Standard with change over contacts
Contact ratings 触点容量	5 A, 240 V
Update rate 更新率	125 ms

3.7 2-Wire transmitter power supply (optional) 两线变送电源供应

Voltage 电压	24V DC
Number 数量	1
Drive 驱动	2 Loops for each transmitter PSU, 45 mA max

4 SAFETY INSTRUCTIONS 安全指南

4.1 SAFETY PRECAUTIONS 安全措施

To ensure the safety of personnel and equipment: 为确保人员及设备安全:

* Always follow the safety, installation, repair and maintenance recommendations in this manual.
  详细阅读本手册安全/安装/维修和维护建议。
* Always observe warning labels on containers and packages. 始终遵守包装上的警告标签。
* All personnel who installs, operates, repairs or maintains the equipment should read this manual completely and make themselves acquainted with the equipment before installing, operating, repairing or maintaining the equipment.
  所有安装/操作/维修或维护设备的人员，在安装/操作/维修或维护设备前，应详细阅读本手册，并熟悉设备。
* Make sure that all safety requirements are met before installing, operating, repairing or maintaining the equipment. 在安装/操作/维修或维护设备前，确保满足所有安全要求。
* Always use personal protective means when necessary. 必要时，始终使用个人防护措施。
* Always use the right tools for the job. 工作时使用正确工具。
* Make sure that all equipment is isolated from the electrical supplies before installing, repairingor maintaining the equipment. 在安装/维修或维护设备前，确保所有设备与电源隔离。
* Never assemble or disassemble electrical equipment or remove or install printed circuit boards with power switched ON. 切勿在打开电源的情况下组装或拆卸电气设备或拆卸或安装印刷电路板。
* Always handle printed circuit boards with CMOS components according to the correct procedures for such components, to prevent any damage due to electrostatic discharges.
  处理带有 CMOS 器件的印刷电路板时，必须按照正确的操作程序操作，避免静电损坏电路板。
* Only use cleaning solvents in a well ventilated area. 只在通风良好的地方使用清洁溶剂。
* Avoid breathing fumes. 避免吸入烟雾。
* Keep away from open fire. 远离明火。
* Do not use solvents on plastic components or parts. 不要在塑料部件上使用溶剂。

5 UNPACKING 拆包装

Let the equipment acclimatize inside the closed box for at least one hour at the location where the controller will be installed.
在将要安装控制器的位置，让设备在密闭的箱体内至少适应一个小时。
When the controller is taken out of the box, please leave the special protection supplied with the equipment as long as possible in place to avoid any damage.
当控制器从盒子中取出时，请尽可能长时间地保留设备提供的特殊保护，以免造成损坏。
Disposal of the packing material should be done according to local laws or regulations, or according to the rules that are applicable on the vessel.
包装材料的处理应根据当地法律法规或船舶上使用的规则进行。

Details of the controller: 控制器信息:
Weight: 0.8 kg approx. (unpacked)
Dimensions: 96x96x112mm (WxHxD)

Figure 2 Controller

6 INSTALLATION 安装

SELECT A LOCATION AWAY FROM STRONG ELECTRICAL AND MAGNETIC FIELDS. IFTHESE CANNOT BE AVOIDED, CONNECT USING SCREENED CABLES WITHIN GROUNDED METAL CONDUIT.
选择一个远离强电场和磁场的地方。如果这些不能避免，使用屏蔽电缆连接接地金属导管。

6.1 SITING 定位

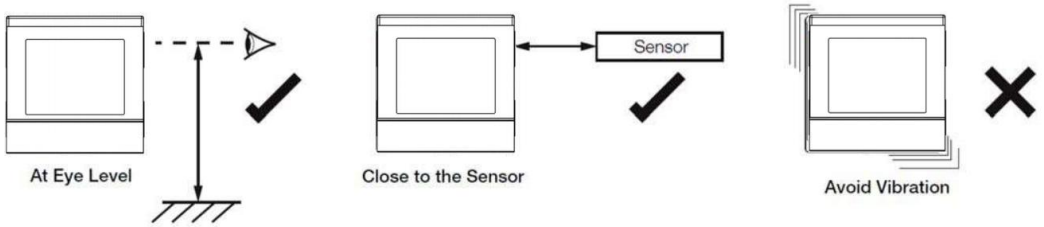


Figure 3 Siting 定位

Figure 4 Environmental Requirements 环境要求

6.2 DIMENSIONS 尺寸

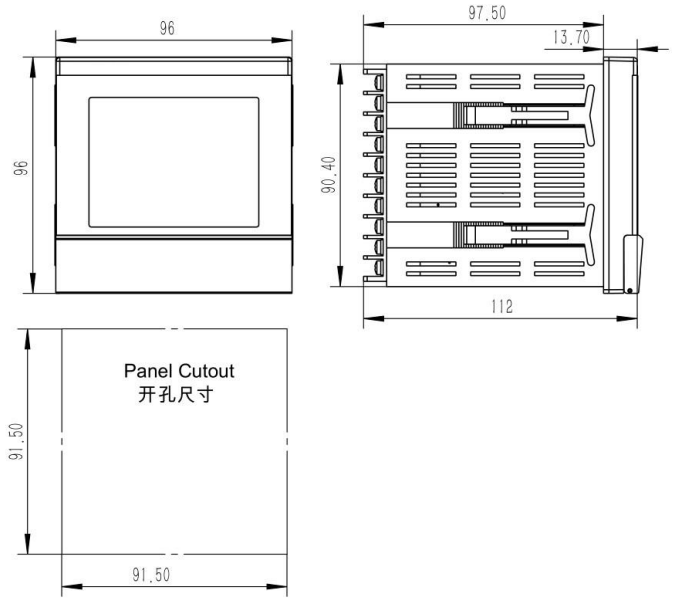


Figure 5 Controller dimensions in mm 控制器尺寸，单位 mm

6.3 MOUNTING 安装

The controller is designed for panel mounting. 控制器设计为面板安装。
To panel-mount the controller 控制器面板安装:

1. Cut a hole of the correct size for the controller in the panel (91.5 x 91.5 mm)。
   在面板上为控制器开一个大小合适的孔(91.5 x 91.5 mm)。
2. Insert the controller into the panel cut-out, referring to Figure 6.
   参考图 6，将控制器插入面板开孔内。
3. Locate the panel clamp anchor A in slot B at the left rear of controller.
   在控制器的左后位置将面板卡座 A 定位在 B 槽位。
4. Push the panel clamp anchor A until A is secured against the panel.
   推动面板卡座 A 直至面板卡座 A 固定在面板上。
5. Repeat steps 3 to 4 to fit the panel clamp anchor A at the right of controller.
   重复步骤 3~4，将面板卡座 A 安装在控制器的右侧.

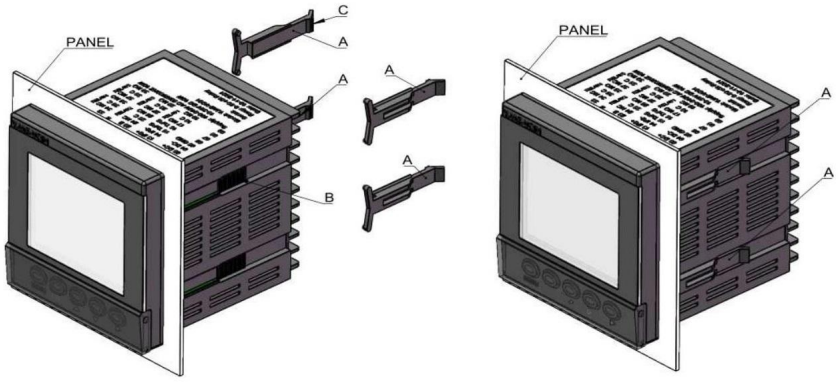


Figure 6 Mounting details 安装步骤

ALLOW SUFFICIENT SPACE FOR INSTALLATION OF CABLES AND FOR SERVICING. 为电缆的安装和维修预留足够的空间。

6.4 ELECTRICAL INSTALLATION 电气安装

WARNING 警告

The controller is not fitted with a power switch therefore a disconnecting device such as a switch or circuit breaker conforming to local safety standards must be fitted to the final installation. 控制器没有安装电源开关，因此在最终安装上必须安装符合当地安全标准的隔离装置，如开关或断路器。

The switch must be mounted in close proximity to the controller within easy reach of the operator and must be marked clearly as the disconnection device for the controller. 开关必须安装在离控制器很近的地方，使操作者容易到达，并且必须清楚地标识为控制器的断开装置。

Remove all power from supply, relay and any powered control circuits and high common mode voltages before accessing or making any connections.
在接入或连接任何电源/继电器和任何有电源的控制电路之前，请切断所有电源。

Use cable appropriate for the load currents. The terminals accept cables from 18 to 14 AWG (0.8 to 2.5mm2).
使用与负载电流相适应的电缆。端子可接电缆范围为 18 ~ 14 AWG(0.8 ~ 2.5 mm2)。

Always route signal leads and power cables separately, preferably in earthed (grounded) metal conduit.
信号线和电源线总是分开走线，最好是在接地的金属导管中。

It is required that screened cable is used for signal inputs and relay connections.
要求屏蔽电缆用于信号输入和继电器连接。

Analog inputs and outputs, transmitter power supply and DC power supply are SELV (Safety Extra Low Voltage) circuits.
模拟输入输出，变送电源和直流电源采用安全超低电压电路。

All connections to secondary circuits must have basic insulation.
所有二次回路的连接必须有基本的绝缘。

After installation, there must be no access to live parts, for example terminals.
安装完成后，不得接触带电部件，如端子等。

Terminals for external circuits are for use with equipment with no accessible live parts only.
外部电路的接线端子只适用于没有可接触带电部件的设备。

If the controller is used in a manner not specified by SHAKIC, the protection provided by the equipment may be impaired.
如果控制器以非 SHAKIC 规定的方式使用，设备提供的保护可能受损。

All equipment connected to the controller's terminals must comply with local safety standards (IEC 60950, EN601010–1). 所有与控制器终端相连的设备必须符合当地的安装标准(IEC 60950, EN601010–1)。

TERMINAL SCREWS MUST BE TIGHTENED TO A TORQUE OF 0.1 Nm .
终端螺丝必须紧固到 0.1 牛米的扭矩。

NOTE 备注:

The electronic controller may be part of a complete viscosity control system. The controller is available in two types to match the specific requirements for different viscosity control systems. For the different systems, different external connection diagrams are available, according to the drawing list below.
控制器是粘度控制系统的一部分，该控制器有两种类型，以满足不同粘度控制系统的具体要求。对于不同的系统，不同的外部接线图是可用的，根据下面的图纸列表。

Before connecting the controller to other system components thoroughly check the compatibility of all system parameters and signals. Connecting non compatible system components will lead to faulty operation and possible destruction of these components. 在连接控制器与系统其它部件之前，请彻底检查所有系统参数和信号的兼容性。连接不 兼容的系统组件，可能会导致这些组件的错误操作和损坏。

Channel	Controller type	Controller output	Alarm	Retransmission output	Drawing No.
1	Viscosity (temperature read out)	RELAY	RELAY	Viscosity	3560-2111
1	Viscosity (temperature read out)	RELAY	RELAY	Viscosity＆temperature	3560-2112
2	Viscosity＆temperature	RELAY	RELAY	Viscosity	3560-2113
2	Viscosity＆temperature	RELAY	RELAY	Viscosity＆temperature	3560-2114
1	Viscosity (temperature read out)	Current 4-20 mA	RELAY	Viscosity＆temperature	3560-2115
2	Viscosity＆temperature	Current 4-20 mA	RELAY	Viscosity＆temperature	3560-2116

The electrical drawings can be found in section 15. 电气图纸见第 15 章节

6.4.1 Viscosity controller 粘度控制器

1. Connect the 4-20 mA signals for viscosity and temperature from the Viscomaster interface box to the input terminals at the back of the controller, in accordance with the electrical connection diagrams in section 17. 按照第 17 节中的电气接线图，将粘度和温度的 4-20mA 信号从粘度计的接线盒连接到控制器后面的输入端子。
2. Connect the cable for main power supply to the terminals at the back of the controller, in accordance with the electrical connection diagrams in section 17.
按照第 17 节中的电气接线图，将主电源电缆连接到控制器后面的端子上。
3. Make sure that all connectors are properly seated before starting operation.
在开始操作之前，确保所有连接正确。

6.4.2 Control valve 控制阀

1. Connect the relays output terminals at the back of the controller to the valve, in accordance with the electrical connection diagrams in section 17 and the directions in the instruction manual supplied with the valve.
按照第 17 节中的电气接线图和随阀门提供的说明书，将控制器后面的继电器输出端子连接到阀门上。
2. Connect the cable for main power supply as instructed in the instruction manual supplied with the control valve.
按照控制阀附带的说明书，连接主电源电缆。

THE CONTROL LEADS MUST BE FUSED EXTERNALLY TO PROTECT THE OUTPUTCIRCUITS.

7 OPERATING INSTRUCTIONS 操作指南

7.1 GENERAL OVERVIEW 总体概述

7.1.1 Display overview 显示概述

The controller display and icons are shown below.控制器显示和图标如下所示

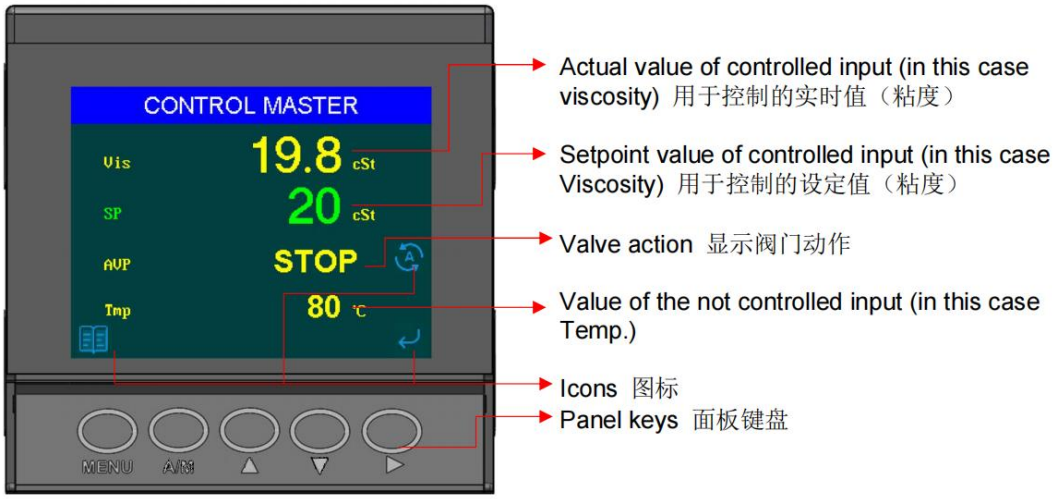
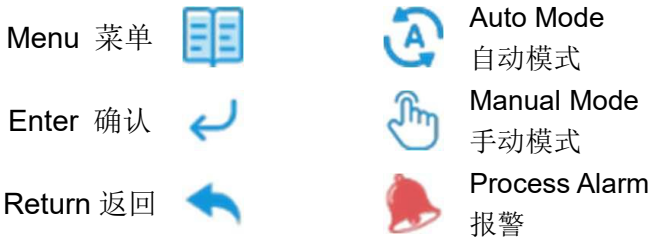


Figure 7 Controller display 控制器显示

7.1.2 Icons 图标



7.1.3 Front panel keys 前面板按键

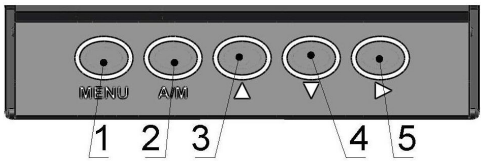


Figure 8 Front panel keys 前面板按键

1		Menu key 菜单键
2		Auto/Manual control mode selectin key 自动控制/手动控制模式选择键
3		Up key-navigate up menu and increase displayed value 向上键导航向上菜单，增加显示值
4		Down key- navigate down menu and decrease displayed value 向下键导航向下菜单，减少显示值
5		Enter key 确认键

7.1.4 Basic Operations 基本操作

After the power is switched on, the controller will perform a self test, initialise and afterwards show the following display. 接通电源后，控制器进行自检，初始化，然后显示如下:

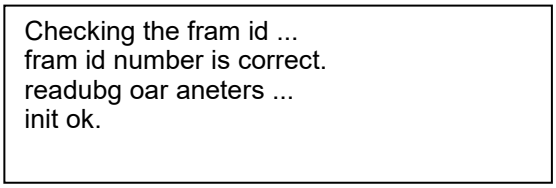


Figure 9 Start-up screen 启动界面

Before the power was turned off, the display will look as shown below. 在关闭电源之前，显示将如下所示:

Figure 10 Dual channel controller in viscosity type mode, with relay output
双通道控制器，粘度控制模式，继电器输出

Figure 11 Dual channel controller in temperature type mode, with relay output
双通道控制器，温度控制模式，继电器输出

The controller will automatically start up in AUTO control mode in the Operator Page 1.
控制器将在操作者页面 1 的自动模式下自动启动。

* AUTO mode is the normal closed loop viscosity or temperature control mode which means that the output is adjusted automatically by the controller in response to the measurements from the input sensor.
自动模式是正常的闭环粘度或温度控制模式，输出由控制器响应输入传感器的测量自动调整。

* The Operator Page 1 is the standard layout of the display from where the different menus can be accessed and the different functions can be controlled.
操作者页面 1 是显示的标准布局，在这里可以访问不同的菜单，可以控制不同的功能。

Changing the controller type from viscosity to temperature (or vice versa) is only available if the controller is equipped with 2 channel input. 只有当控制器配备了 2 通道输入时，才可以将控制器类型从粘度改为温度（反之亦然）。

7.2 MENU LAYOUT AND SETUP 菜单布局和设置

Before the controller can be used, it has to be properly configured. Most parameters are already set at the Factory, but some parameters still have to be set to the appropriate values in accordance to the specific system. 在使用控制器之前，必须对控制器进行正确的配置。大部分参数在工厂已经设置好了，但是有些参数还需要根据具体的系统设置合适的值。

The controller has a menu layout as shown below. 控制器的菜单布局如下所示。 Figure 12 Menu layout

1 Operator Page 1	1.1 Adujst Control SP1			
	1.2 Adujst Control OP1			
	1.3 Alarm Acknowledge			
	1.4 View Select	1.4.1 Operator Page 1		
		1.4.2 Diagnostic View		
	1.5 Control Type	1.5.1 Viscosity		
		1.5.2 Temperature		
	1.6 Enter Config Mode	1.6.1 Basic	1.6.1.1 Viscosity Alarms set	1.6.1.1.1~1.6.1.1.6
			1.6.1.2 Viscosity Control set	1.6.1.2.1~1.6.1.2.3
			1.6.1.3 Viscosity Range set	
			1.6.1.4 Viscosity Units	
			1.6.1.5 Temperature Alarms set	1.6.1.5.1~1.6.1.5.6
			1.6.1.6 Temperature Control set	1.6.1.6.1~1.6.1.6.3
			1.6.1.7 Temperature Source set	
			1.6.1.8 Temperature Range set	
			1.6.1.9 Valve Control set	1.6.1.9.1~1.6.1.9.2

7.2.1 Basic Setup Menu(menu 1.6.1) 基本设置菜单

When the controller has started up, the Operator Level Menus can be accessed by pressing the menu key. 控制器启动后，按菜单键可进入操作者级别菜单。

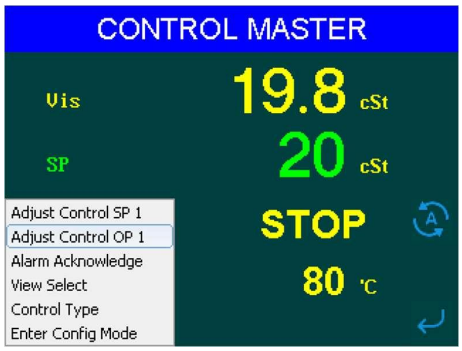


Figure 13 Enter Configuration Mode 进入配置模式

* Press the down key to navigate through the menu to the Enter Config. Menu and press the enter key to enter. 按向下键通过菜单导航至输入配置模式，按确认键进入。

* Next, press the enter key to scroll down to Basic and press the enter key to enter. 接下来，按确认键向下滚动到基本，并按确认键进入:

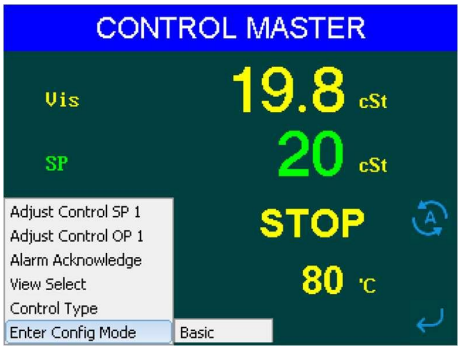


Figure 14 Basic 基本

Before the Basic Menu can be entered, a password must be entered. The password is “123321”.
在进入基本菜单之前，必须输入密码。密码为“123321”。

Figure 15 Enter Password 输入密码

* Press the up / down keys to choose number.按向上 /向下键选择数字

* Press the enter key to confirm number. 按确认键确认数字

* Finally press the up / down keys to choose “en”. 按向上 /向下键选择“en”

* Press the enter key to confirm “en”. 按 确认键确认“en”进入。

From the Basic Setup Menu all parameters, available for the user, can be set.
从基本设置菜单中，可以设置用户可用的所有参数。

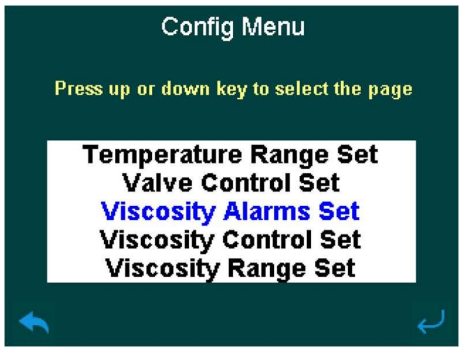


Figure 16 Config Menu

In the following sections all menus and parameters will be explained.
在下面的章节中，将解释所有菜单和参数。

BASED ON THE SPECIFIC CONFIGURATION OF THE CONTROLLER NOT ALL PARAMETERS MAY BE AVAILIBLE.
根据控制器的具体配置，并非所有参数都可用。

7.2.1.1 Viscosity Alarms Menu (menu 1.6.1.1) 粘度报警菜单

In the viscosity alarms menu parameters can be set regarding the viscosity alarms.
在粘度报警菜单中可以设置有关粘度报警的参数。

Menu	Description	Range	Defaul	Remark
1.6.1.1.1	High Deviation Trip	-9999 - 99999 cst	2 cst	The value is the amount added to the current setpoint in order to trigger the alarm. If the current viscosity exceeds this total value the alarm is triggered. Example: Setpoint=12 High Deviation Trip value = 2 Alarm is triggered if actual value > 14 (12+2).
1.6.1.1.2	High Deviation Time Hysteresis	0 - 9999 s	10 s	The value is the time delay, before the alarm is triggered. Example: High Dev Time Hyst. = 10 s. Alarm viscosity value = 14 (12+2) Actual viscosity value = 16 Alarm is triggered after 10 seconds.
1.6.1.1.3	High Deviation Trip Hysteresis	0 - 99999 cst	0 cst	The value is the amount subtracted from the sum of the setpoint and High Deviation Trip in order to turn off the alarm. If the actual viscosity is less than this value the alarm will turn off. Example: Setpoint = 12 High Deviation Trip value = 2 High Deviation Trip Hysteresis = 1 Alarm is turn off if actual value < 13 (12+2-1).
1.6.1.1.4	Low Deviation Trip	-9999 - 99999 cst	-2 cst	The value is the amount added to the current setpoint in order to trigger the alarm. If the current viscosity level is less than this total value the alarm is triggered. Example: Setpoint = 12 High Deviation Trip value = -2 Alarm is triggered if actual value < 10 (12+ -2).
1.6.1.1.5	Low Deviation Time Hysteresis	0 - 9999 s	10 s	The value is the time delay, before the alarm is triggered. Example: Low Dev Time Hyst. = 10 s. Alarm viscosity value = 10 (12+ -2) Actual viscosity value = 8 Alarm is triggered after 10 seconds.
1.6.1.1.6	Low Deviation Trip Hysteresis	0 - 99999 cst	0 cst	The value is the amount added to the sum of the setpoint and Low Deviation Trip in order to turn off the alarm. If the actual viscosity exceeds this value the alarm will turn off. Example: Setpoint = 12 Low Deviation Trip value = -2 High Deviation Trip Hysteresis = 1 Alarm is turn off if actual value > 11 (12+ -2+1).

7.2.1.2 Viscosity Control Menu (menu 1.6.1.2) 粘度控制菜单

In the viscosity control menu parameters can be set regarding the way controller the viscosity is controlled. 在粘度控制菜单中，可以根据控制粘度的方式设置参数。

Menu	Description	Range	Default	Remark
1.6.1.2.1	Proportional Band	1.0 - 999.9%	34 %	Lower value = longer impulses, more sensitive reaction Higher value = shorter impulses, less sensitive reaction
1.6.1.2.2	Integral Time	0 - 10000 s	240 s	Lower value = shorter impulse gaps, faster balancing Higher value = longer impulse gaps, slower balancing
1.6.1.2.3	Setpoint	0 - 50 mPa.s	12 mPa.s	The value is the setpoint the controller has when first turned on.

7.2.1.3 Viscosity Range Menu (menu 1.6.1.3) 粘度范围菜单

In the viscosity range menu the analog viscosity input and output range can be set. The input range and retransmission output range are always the same.

在粘度范围菜单中可以设置粘度输入和输出范围。输入范围和变送输出范围总是相同的。

Menu	Description	Range	Default	Remark
1.6.1.3	Viscosity Range	0 - 9999	0 - 50	The value is depending on the output range of the Viscomaster interfacebox. The range is stated on the inside of the interfacebox. When in doubt, check the Viscomaster specifications. Example: Low analog input 4 mA ~ 0 mPa.s High analog input 20 mA ~ 50 mPa.s.

7.2.1.4 Viscosity Units Menu (menu 1.6.1.4) 粘度单位菜单

In the viscosity units menu the units for viscosity displayed on the screen can be set.

在粘度单位菜单中，可以设置屏幕上显示的粘度单位。

Menu	Description	Range	Default	Remark
1.6.1.4	Viscosity Units	mPa.s cSt	cSt	Unit in which the viscosity is displayed on the screen.

7.2.1.5 Temperature Alarms Menu (menu 1.6.1.5) 温度报警菜单

In the temperature alarms menu parameters can be set regarding the temperature alarms.

在温度报警菜单中可以设置有关温度报警的参数。

Menu	Description	Range	Default	Remark
1.6.1.5.1	High Deviation Trip	-9999 - 99999 ℃	10 ℃	The value is the amount added to the current setpoint in order to trigger the alarm. If the current temperature exceeds this total value the alarm is triggered. Example: Setpoint = 135 High Deviation Trip value = 10
1.6.1.5.2	High Deviation Time Hysteresis	0 - 9999 s	10 s	The value is the time delay, before the alarm is triggered. Example: High Dev Time Hyst. = 10 s. Alarm temperature value = 145 (135+10) Actual temperature value = 147 Alarm is triggered after 10 seconds.
1.6.1.5.3	High Deviation Trip Hysteresis	0 - 99999 ℃	0 ℃	The value is the amount subtracted from the sum of the setpoint and High Deviation Trip in order to turn off the alarm. If the actual temperature is less than this value the alarm will turn off. Example: Setpoint = 135 High Deviation Trip value = 10 High Deviation Trip Hysteresis = 5 Alarm is turn off if actual value < 140 (135+10-5).
1.6.1.5.4	Low Deviation Trip	-9999 - 99999 ℃	-10 ℃	The value is the amount added to the current setpoint in order to trigger the alarm. If the current temperature level is less than this total value the alarm is triggered. Example: Setpoint = 135 High Deviation Trip value = -10 Alarm is triggered if actual value < 125 (135+ -10).
1.6.1.5.5	Low Deviation Time Hysteresis	0 - 9999 s	10 s	The value is the time delay, before the alarm is triggered. Example: Low Dev Time Hyst. = 10 s. Alarm temperature value = 125 (135+ -10) Actual temperature value = 123 Alarm is triggered after 10 seconds.

1.6.1.5.6	Low Deviation Trip Hysteresis	0 - 99999 ℃	0 ℃	The value is the amount added to the sum of the setpoint and Low Deviation Trip in order to turn off the alarm. If the actual temperature exceeds this value the alarm will turn off. Example: Setpoint = 135 Low Deviation Trip value = -10 High Deviation Trip Hysteresis = 5 Alarm is turn off if actual value > 130 (135+ -10+5).

7.2.1.6 Temperature Control Menu (menu 1.6.1.6) 温度控制模式

In the temperature control menu parameters can be set regarding the way controller the viscosity is controlled. 在温度控制菜单中，可以根据控制温度的方式设置参数。

Menu	Description	Range	Default	Remark
1.6.1.6.1	Proportional Band	1.0 - 999.9%	34 %	Lower value = longer impulses, more sensitive reaction Higher value = shorter impulses, less sensitive reaction
1.6.1.6.2	Integral Time	0 - 10000 s	240 s	Lower value = shorter impulse gaps, faster balancing Higher value = longer impulse gaps, slower balancing
1.6.1.6.3	Setpoint	0 - 200 ℃	135 ℃	The value is the setpoint the controller has when first turned on.

7.2.1.7 Temperature Source Menu (menu 1.6.1.7) 温度信号源菜单

In the temperature source menu the type of temperature input can be set.
在温度信号源菜单中可以设置温度输入类型

Menu	Description	Range	Default	Remark
1.6.1.7	Temperature Source	mA PT100	mA	The value is depending whether the controller is connected to the Viscomaster interfacebox. If connected to the interfacebox the temperature source is always mA. Only when an external PT100 is used the temperature source is PT100.

7.2.1.8 Temperature Range Menu (menu 1.6.1.8) 温度范围菜单

In the temperature range menu the analog temperature input and output range can be set. The input range and retransmission output range are always the same.
在温度范围菜单中可以设置温度输入和输出范围。输入范围和变送输出范围总是相同的。

Menu	Description	Range	Default	Remark
1.6.1.7	Temperature Range	0 - 9999℃	0 - 200 ℃	The value is depending on the output range of the Viscomaster interfacebox. The range is stated on the inside of the interfacebox. When in doubt, check the Viscomaster specifications. Example: Low analog input 4 mA ~ 0 ℃ High analog input 20 mA ~ 200 ℃.

7.2.1.9 Valve Menu (menu 1.6.1.9) 阀门菜单

Menu	Description	Range	Default	Remark
1.6.1.9.1	Minimum On Time	0 - 60 s	2 s	The value is the minimum time a relay is energized. This is to prevent the relay from chattering.
1.6.1.9.2	Travel Time	0 - 5000 s	60 s	The value is the time it takes the valve to travel from a completely closed position to a completely open position.

7.3 CHANGING THE CONTROLLER TYPE FROM VISCOSITY TO TEMPERATURE (OR VICE VERSA)

将控制器类型由粘度切换为温度（反之亦然）

Changing the controller type from viscosity to temperature (or vice versa) is only available if the controller is equipped with 2 channel control action.
只有当控制器设有 2 路控制动作时，可以改变控制器类型从粘度到温度（反之亦然）。

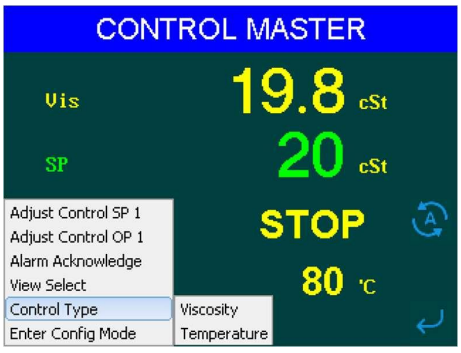


Figure 17 Viscosity to Temperature change over 粘度控制切换温度控制

* Press the down key to navigate through the menu to Control Type and press the enter key to enter.

按向下键通过菜单导航至“Control type”，按确认键进入

* Press the down key to scroll down to Temperature and press the enter key to enter.按向下键滚动至“Temperature”，按确认键进入

Figure 18 Temperature control 温度控制

To change back to viscosity control type, repeat the steps above but, select Viscosity instead of Temperature. 要切换回粘度控制类型，重复上面的步骤，但此时选择粘度而不是温度。

7.4 ADJUSTING THE SETPOINT IN AUTOMATIC CONTROL MODE 自动控制模式下调节设定值

* Press the down key to navigate through the menu to Adjust Control SP 1 and press the enter key to enter. 按向下键通过菜单导航至“Adjust Control SP 1”，按确认键进入

* “SP”flashing display for 10s and Pressing the up / down keys will change the setpoint during flashing .

“SP”闪烁 10s，在闪烁期间按向上 /向下键将改变设定值

Figure 19 Controller in automatic control mode 控制器在自动模式下

The controller need in automatic control mode, pressing the up / down keys will change thesetpoint. Depending on the control type (viscosity or temperature) the viscosity or temperature setpointis adjusted. 控制器需要在自动控制模式下，按上下键改变设定值。根据控制类型（粘度或温度），粘度或温度设定值进行调整。

7.5 CHANGING FROM AUTOMATIC TO MANUAL CONTROL MODE (OR VICE VERSA)

自动模式切换至手动模式（反之亦然）

When the controller starts-up, the control mode is normally automatic.

当控制器启动时，正常情况下控制器是自动模式。

If an input alarm occurs because an input signal is not present at start-up, the controller will start-up in manual mode. 如果由于启动时没有输入信号而出现报警，控制器将以手动模式启动。

In automatic control the valve position is controlled by a normal closed loop control mode which means that the output is adjusted automatically by the controller in response to the measurements from the input sensor (viscosity or temperature, depending on the control type).

在自动控制中，阀门位置又一个正常的闭环控制模式控制，这意味着输出由控制器根据输入传感器的测量值（粘度或温度，取决于控制类型）自动调整。

* To change the control mode from automatic to manual (or vice versa), press the Auto/Manual control mode selection key. 按自动/手动控制模式选择键，将控制模式由自动切换至手动（反之亦然）。

The current status of the controller is indicated by the icon in the right lower corner.

控制器的当前状态由控制器右下角的图标表示。

Auto Mode

自动模式

Manual Mode

手动模式

Figure 20 Controller in automatic control mode 控制器自动模式

Figure 21 Controller in manual control mode 控制器手动模式

In manual control the valve position is not controlled or adjusted automatically, but remains in the position set by the operator.

在手动控制中，阀门的位置不是自动控制或调整的，而是保持在由操作者设定的位置上。

7.6 ADJUSTING THE VALVE POSITION IN MANUAL CONTROL MODE

在手动模式下，调整阀门位置

When the controller is in manual control mode, pressing the up / down keys will normally change the position of the valve. 当控制器在手动模式中，按向上键 /向下键将改变阀门的位置

Figure 22 Controller in manual control mode, ready to adjust the valve position 控制器手动模式，准备调节阀门位置

7.7 ALARM INDICATORS 报警指示

7.7.1 Process alarm 过程报警

If a process alarm occurs, it is indicated as follows: 如果由报警产生，报警指示如下所示：

Figure 25 Viscosity alarm 粘度报警

Process alarms are triggered when viscosity or temperature are outside the thresholds set in the Viscosity Alarms Menu, section 7.2.1.1 and Temperature Alarms Menu, section 7.2.1.5.
当粘度或温度操作 7.2.1.1 节粘度报警菜单和 7.2.1.5 节温度报警菜单中设置的阈值时，会触发报警。

7.7.2 Sensor failure 传感器故障

Beside a process alarm, an alarm is also triggered when there is a sensor break.
除了过程报警外，当传感器断线时，也会触发报警。
If a sensor failure occurs, it is indicated as follows: 如果传感器故障产生，报警指示如下所示：

Figure 26 Sensor failure 传感器故障

When a sensor failure occurs the controller switches to manual mode automatically. If the sensor failure is resolved the controller will stay in manual mode.
当传感器故障产生时，控制器自动切换至手动模式。如果传感器故障被解决，控制器将保持在手动模式。

7.7.3 Alarm acknowledgement 报警应答

To acknowledge an alarm 应答一个报警

* Press the menu key 

. 按菜单键 

* Press the down key  to navigate through the menu to Alarm Acknowledge.按向下键  通过菜单导航至“Alarm Acknowledge”

* Press the enter key  to enter. 按确认键进入

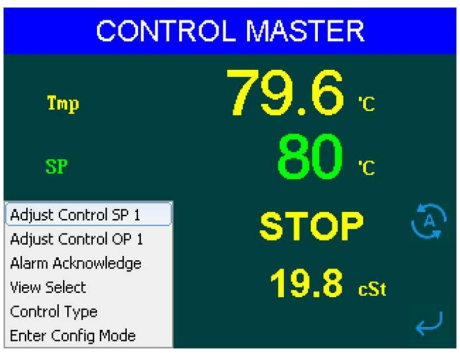


Figure 27 Alarm Acknowledge 报警应答

If the alarm condition is still present when the alarm is acknowledged, the alarm icon in the top right corner will stop flashing and will be continuously lit. This state will continue for as long as the alarm condition remains. When the alarm condition disappears the indication will also disappear.
在确认报警时，如果报警状态仍然存在，则右上角的报警图标将停止闪烁,并持续亮着，只要报警状态仍然存在，此状态就会持续。当报警状态消失，报警图标也会消失。
If a relay has been connected to the alarm output, it will energise when the alarm condition occurs. Depending on how the wiring is connected to the relay, the contact will open or close. The alarm will remain in this condition until the alarm is acknowledged and the alarm conditions are no longer present.
如果报警输出端连接继电器，当报警发生时，继电器将得电。触点的打开或关闭取决于继电器的接线。报警将一直处于这种状态，直至报警被确认并且报警不再存在
If the alarm conditions disappears before the alarm is acknowledged, the alarm indication will also disappear. 如果在确认报警前，报警消失了，则报警指示也会消失

7.7.4 Diagnostic view 诊断界面

To navigate to Diagnostic View 导航至诊断界面

* Press the menu key 

. 按菜单键 

* Press the down key  to navigate through the menu to View Select.按向下键  通过菜单导航至“View Select”

* Press the enter key  to enter. 按确认键  进入

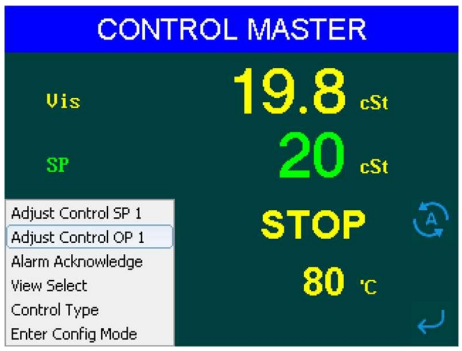


Figure 28 View Select 界面选择

To navigate to Diagnostic View 导航至诊断界面

* Press the down key  to navigate to Diagnostic View.按向下键  导航至“Diagnostic View”

* Press the enter key  to enter. 按确认键  进入

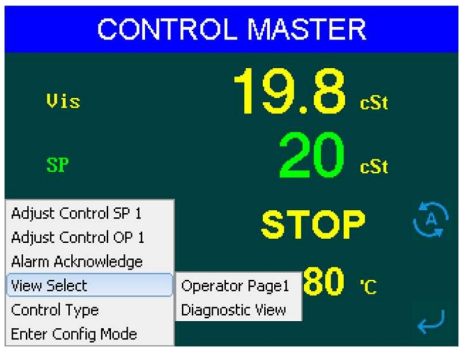


Figure 29 Entering Diagnostic view 进入诊断界面

In the diagnostic view the current alarms are shown.诊断界面中显示当前报警信息

Figure 30 Diagnostic View 诊断界面

8 MAINTENANCE 维护

Under normal conditions the viscosity controller requires no maintenance. Conditions what are considered “Normal” are: 在正常情况下，粘度控制器不需要维护。被认为正常的情况有：

* A clean operating environment. 清洁的操作环境。
* The controller is installed in accordance with the installation instructions given. 按照控制器的安装说明进行安装
* Operation of the controller and the related control system in accordance with this manual and other related publications 控制器及相关控制系统的操作按照本手册及其它相关手册进行。
* Uninterrupted power supply at normal specified values 不间断电源在正常的范围内。

WHEN CLEANING OF THE CONTROLLER HOUSING IS REQUIRED USE A SOFT CLOTH. DO NOT USE SOLVENTS OR AGGRESSIVE FLUID ON PLASTIC COMPONENTS OR PARTS.当清晰控制器外壳时，需要使用软布。不要在塑料部件上使用溶剂或腐蚀性液体。

PREVENT ANY MOISTURE PENETRATING THE CONTROLLER.
防止水份渗入控制器。

9 REPAIR OR REPLACEMEN 修理或更换

SAFETY PRECAUTIONS 安全措施:

MAKE SURE THAT ALL SAFETY REQUIREMENTS AS DESCRIBED IN SECTION 4 ARE MET BEFORE ANY WORK IS COMMENCED.
在开始任何操作之前，确保符合第 4 章节所述的所有安全要求。

9.1 CUSTOMER REPAIR RESTRICTION 客户修理限制

In case of malfunction, repair work by the user should be restricted to the externally accessible leads, connections and components to which the user is expressly permitted to deal with himself. (e.g. bridge circuits, fuses etc.). 如果发生故障，用户的维修工作仅局限于用户能够自己处理的外部接线和组件。（如外部电路，保险丝等）

All further work, especially on internal components will terminate warranty and can cause considerable damage to the circuitry. 所有进一步的工作，特别是内部部件将终止保修，并可能对电路造成相当大的损害。

9.2 REPLACEMENT 更换

To replace the controller, the following steps should be taken 更换控制器的操作如下:

* Write down all parameter settings as described in sections 7.2.1.1 trough 7.2.1.9. 按照 7.2.1.1-7.2.1.9 章节的要求写下所有参数设置。
* Switch off the 100/240 VAC electrical supply. 关闭 AC100/240V 电源。
* Make sure that all connections to the controller are labelled correctly so that re-installation can be done without any errors. 确保所有到控制器的连接都被正确地标记，以便重新安装时不会出现任何错误。
* Disconnect all the connections in a reverse order as described in section 6.

按照第 6 章节中描述的反向步骤断开所有固定件。

* Reinstall a replacement controller as described in section 6.
  按照第 6 章节的参考步骤重新安装待更换的控制器。
* Set all the previous written down parameter settings as described in sections 7.2.1.1 trough 7.2.1.9.
  按照 7.2.1.1-7.2.1.9 章节的描述设置所有之前写下来的参数。

10 TAKE OUT OF SERVICE 退出服务

SAFETY PRECAUTIONS 安全措施:
MAKE SURE THAT ALL SAFETY REQUIREMENTS AS DESCRIBED IN SECTION 4 ARE MET BEFORE ANY WORK IS COMMENCED.
在开始任何操作之前，确保符合第 4 章节所述的所有安全要求。

The controller can be taken out of service by switching off the 100/240 VAC electrical supply and disconnecting all wires. 关闭 AC100/240V 电源和断开所有电线，控制器可以退出服务。

11 REMOVAL AND STORAGE OF EQUIPMENT 拆除与保管

SAFETY PRECAUTIONS 安全措施:
MAKE SURE THAT ALL SAFETY REQUIREMENTS AS DESCRIBED IN SECTION 4 ARE MET BEFORE ANY WORK IS COMMENCED.
在开始任何操作之前，确保符合第 4 章节所述的所有安全要求。

To remove and store the controller, the following steps have to be taken 拆卸和存储控制器的步骤如下:

* Switch off the 100/240 VAC electrical supply. 关闭 AC100/240V 电源。
* Make sure that all connections to the controller are labelled correctly so that re-installation can be done without any errors. 确保所有到控制器的连接都被正确标记，以便重新安装时不会出现任何错误。
* Disconnect all the connections in a reverse order as described in section 6.
  按照第 6 章节中描述的反向步骤断开所有固定件
* Store the controller in a cool and dry location, is such way that the controller cannot be damaged.
  将控制器保存在阴凉干燥的地方，避免损坏控制器。

12 MALFUNCTION AND SEND FOR REPAIR 故障及维修

In the event the controller has to be sent back for repair, always send the whole controller including the outer housing directly to SHAKIC. 如果控制器需要返修，将整个控制器（包括外壳）寄回 SHAKIC。

13 CALIBRATION CERTIFICATES 校验证书

Calibration certificates are delivered separately. 校验证书单独提交。

14 TROUBLE SHOOTING AND FAULT FINDING 故障排查和故障发现

14.1 DIAGNOSTIC INFORMATION 诊断信息

The electronic controller has a provision for diagnostic indication. Failures alarms and errors are displayed in the diagnostic view. 该控制器具有诊断指示。故障报警和错误信息显示在诊断界面中。

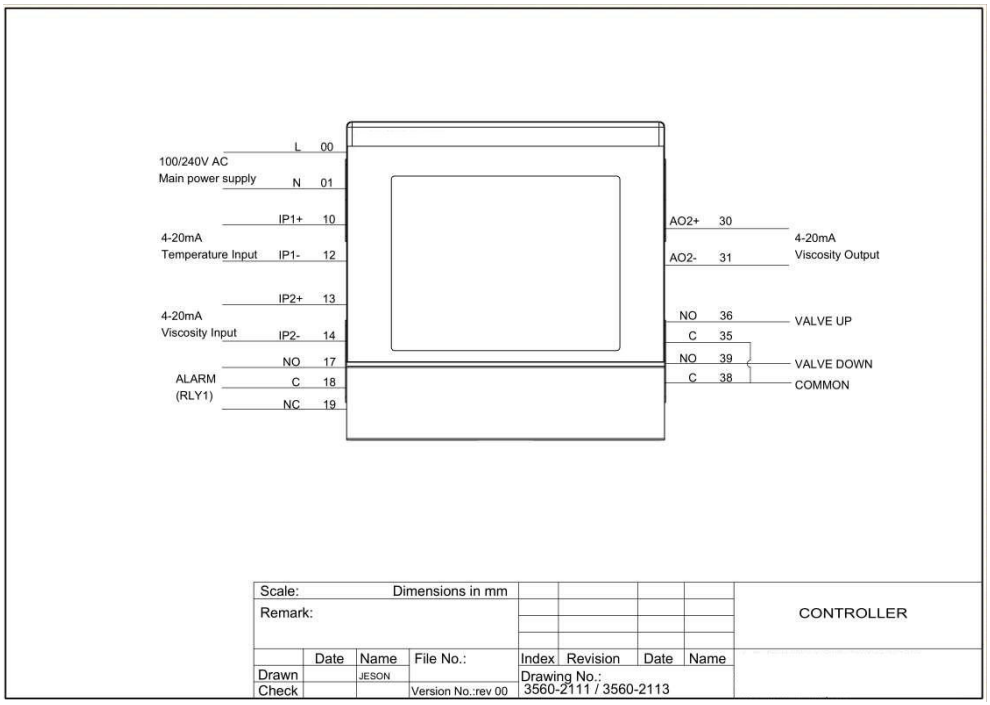
14.2 GENERAL TROUBLE SHOOTING 常见问题及解决

Problem 故障	Possible cause 可能的原因	Corrective action 纠正操作
Display remains blank 显示空白	No electrical supply to controller 控制器没有电	Check supply 检查电源
Process Alarm: Visc. Low 过程报警：粘度低	Air entrapped in the fuel system 燃油系统中进入空气	Vent the system 对系统进行排气
	Fuel mixed with MDO 燃油与 MDO 混合	Check valves of fuel supply. 检查燃油供应管系的阀门
	Fuel temperature too high during normal system operation, due to overabundant heating. 系统正常运行时燃油温度过高，原因是加热过旺	Decrease output signal of the controller tothe heat exchanger. 降低控制器对换热器的输出 Check if control valve functions properly.Consult the factory if this does not solve the problem. 检查控制阀功能是否正常。如果不能解决问题，请咨询工厂
Process Alarm: Visc. High 过程报警：粘度高	Fuel too cold during start-up. 启动时燃油太冷	Check fuel line heat tracing and/or fuel heater. 检查燃油管路伴热/燃油加热器
	Fuel temperature too low during normal system operation, due to insufficient heating. 系统正常运行时，由于加热不足， 燃油温度过低	Increase output signal of the controller to the heat exchanger. 增加控制器对换热器的输出 Check main steam or thermal oil supply. 检查蒸汽或热油供应 Check if control valve functions properly.Consult the factory if this does not solve the problem. 检查控制阀功能是否正常。如果不能解决问题，请咨询工厂
Sensor Failure: Visc. Fault 传感器故障：粘度故障	No electrical supply to the viscosity sensor 粘度传感器没有电	Check mains supply of the Viscomaster interface box. 检查粘度计接线盒的电源 Check the fuses of the control unit and/or power supply unit. 检查控制单元/电源单元的保险丝 Check the integrity of all electrical connections. 检查所有电气连接的完整性
	Current loop connection broken 电流回路断开	Check electrical wiring of the Viscomaster interface 4-20 mA output signal. 检查粘度计 4-20mA 接口的电气连接
	Viscosity sensor malfunctioning 粘度传感器故障	Contact YUAN JIAN for repair 联系 YUANJIAN 维修
Process Alarm: Temp. Low 过程报警：温度低	Fuel temperature too low during normal system operation, due to insufficient heating. 系统正常运行时，由于加热不足，燃油温度过低	Increase output signal of the controller to the heat exchanger. 增加控制器对换热器的输出 Check main steam or thermal oil supply. 检查蒸汽或热油供应 Check if control valve functions properly.Consult the factory if this does not solve the problem. 检查控制阀功能是否正常。如果不能解决问题，请咨询工厂
Process Alarm: Temp. High 过程报警：温度高	Fuel temperature too high during normal system operation, due to overabundant heating. 系统正常运行时燃油温度过高，原因是加热过旺	Decrease output signal of the controller tothe heat exchanger. 降低控制器对换热器的输出 Check if control valve functions properly.Consult the factory if this does not solve the problem. 检查控制阀功能是否正常。如果不能解决问题，请咨询工厂

Sensor Failure: Temo. Fault 传感器故障：温度故障	No electrical supply to the temperature sensor 温度传感器没有电	Check mains supply of the Viscomaster interface box. 检查粘度计接线盒的电源 Check the fuses of the control unit and/or power supply unit. 检查控制单元/电源单元的保险丝 Check the integrity of all electrical connections. 检查所有电气连接的完整性
	Current loop connection broken 电流回路断开	Check electrical wiring of the Viscomaster interface 4-20 mA output signal. 检查粘度计 4-20mA 接口的电气连接
	Viscosity sensor malfunctioning 粘度传感器故障	Contact SHAKIC for repair 联系 SHAKIC 维修
Oscillating temperature without distinct initial overshot 振荡温度，初始超调不明显		Proportional band Pb (%) setting it too low. 比例带 Pb (%)设置过低 Adjust the Pb setting (menu 7.2.1.2,7.2.1.6) 调整 Pb 设置 A higher Pb setting results in shorter impulses and a less sensitive reaction. 较高 Pb 设置导致较短脉冲和不太灵敏的反应
The set point is reached very slowly after initial exceeding 设定点在初次超过后非常缓慢地到达		Proportional band Pb (%) setting it too high. 比例带 Pb (%)设置过高 Adjust the Pb setting (menu 7.2.1.2, 7.2.1.6) 调整 Pb 设置 A lower Pb setting results in longer impulses and a more sensitive reaction. 较低 Pb 设置导致较长脉冲和更灵敏的反应
High initial overshot followed by fading oscillation 高初次超调紧随衰减振荡		Integral action time Ti (s) setting it too low. 积分动作时间 Ti (s)设置过低 Adjust the Ti setting (menu 7.2.1.2, 7.2.1.6) 调整 Ti (s)设置 A higher Ti setting results in longer impulse gaps and slower balancing. 较高的 Ti (s)设置导致较长的脉冲间隙和较慢的平衡
The set value is reached very slowly without overshooting 达到设定值的速度非常慢，不会超调		Integral action time Ti (s) setting it too high. 积分动作时间 Ti (s)设置过高 Adjust the Ti setting (menu 7.2.1.2, 7.2.1.6) 调整 Ti (s)设置 A lower Ti setting results in shorter impulse gaps and faster balancing. 较低的 Ti (s)设置导致更短的脉冲间隙和更快的平衡

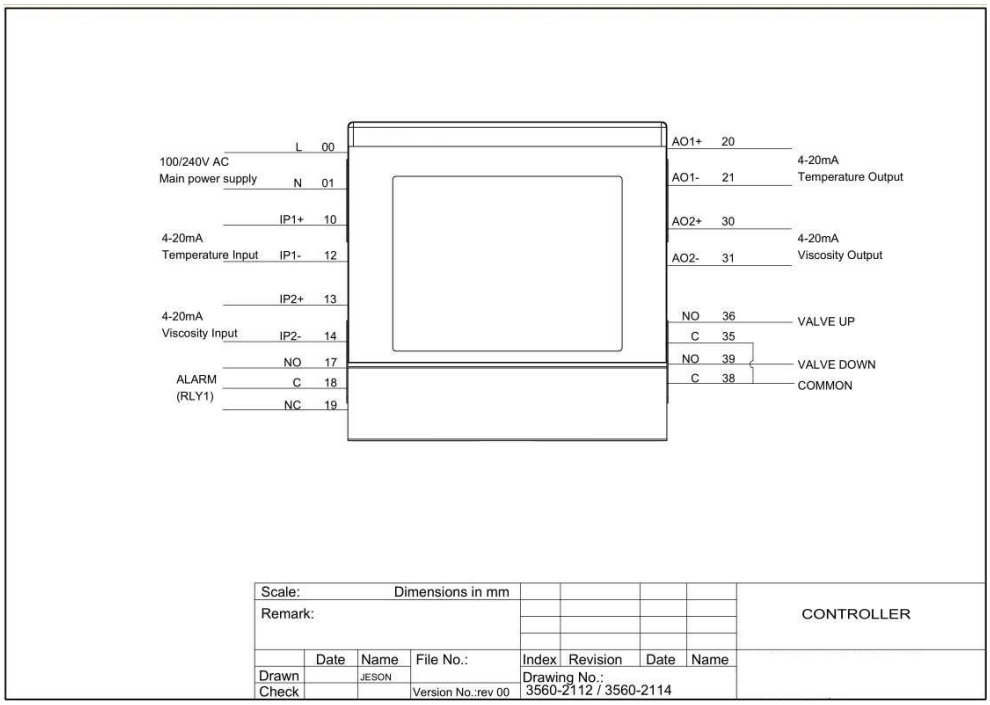
An optimum adaptation of the control parameters (P,I) is necessary in order to balance an appearing deviation as quickly, non-oscillating and exactly as possible, according to the give operation conditions. Generally these adjustments require a lot of professional knowledge that cannot be replacement by this brief information. The information above is for help purpose only.
为了根据给定的操作条件尽可能块地、无振荡地、准确地平衡出现的偏差，控制参数(PI)的最佳自适应是必要的。一般来说，这些调整需要大量的专业知识，这些知识不能被这些简短的信息所替代。以上资料仅供参考。

15 DRAWINGS 图纸



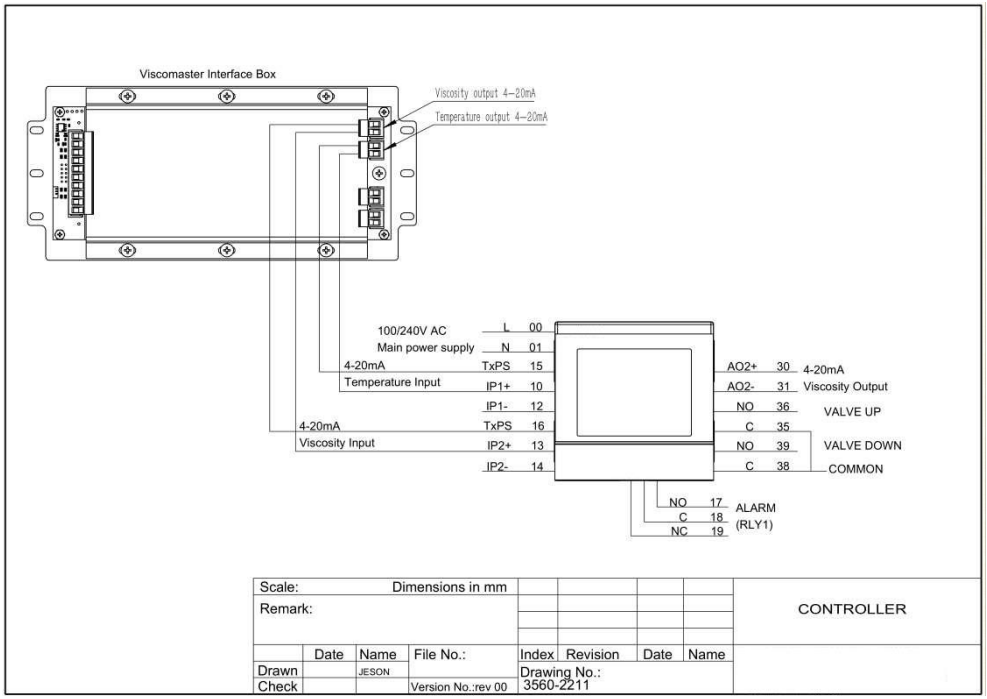
3560-2111 Connection diagram 1 channel relay output 1 Retransmission
1 路通道、继电器输出、1 路变送

3560-2113 Connection diagram 2 channel relay output 1 Retransmission
2 路通道、继电器输出、1 路变送



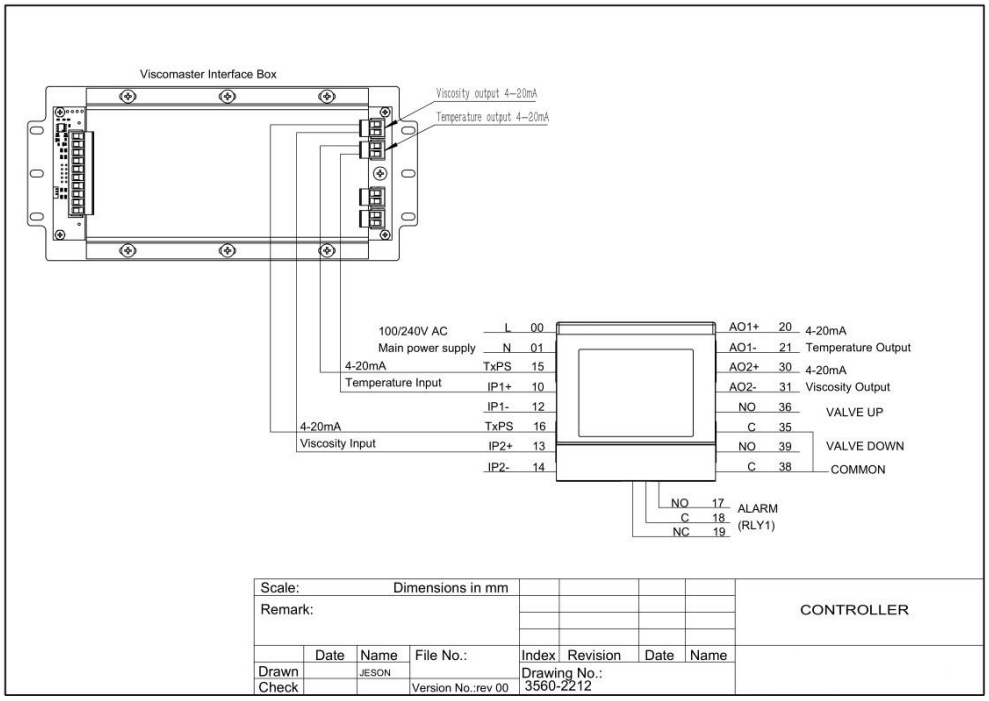
3560-2112 Connection diagram 1 channel relay output 2 Retransmission
1 路通道、继电器输出、2 路变送

3560-2114 Connection diagram 2 channel relay output 2 Retransmission
2 路通道、继电器输出、2 路变送



3506-2211 Connection diagram 2 channel relay output 1 Retransmission + SHAKIC Viscomaster

2 路通道、继电器输出、1 路变送+SHAKIC 粘度计



3506-2212 Connection diagram 2 channel relay output 2 Retransmission + SHAKIC Viscomaster

2 路通道、继电器输出、2 路变送+SHAKIC 粘度计

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