

## CG-2034-01 Digital Overhead Stirrer



**CHEMGLASS**

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### Guarantee

You have purchased an original Chemglass machine which meets the highest engineering and quality standards. In accordance with Chemglass guarantee conditions, the guarantee period is 24 months. For claims under the guarantee please contact Chemglass Technical Service Dept to obtain a Return Authorization Number (RA#). You will be liable for freight costs.

### Safety Instructions

Never operate the equipment with the stirrer tools rotating freely. Ensure that parts of the body, hair or items of clothing cannot be trapped by the rotating parts. Pay attention when setting the speed to any imbalance of the stirrer tools and possible spraying of the medium to be stirred. Use a stirrer shaft protection device!

The equipment is not suitable for manual operation. Please follow the relevant safety instructions and guidelines, and occupational health and safety regulations for use in the laboratory.

Avoid knocks and impacts on the lower end of the shaft and the chuck gear teeth. Even minor, invisible damage can lead to imbalance and uneven shaft action. Careful handling guarantees safe working and the long life of the equipment.

Imbalance of the output shaft, the chuck and in particular the stirring tools can lead to uncontrolled resonant vibrational behavior

of the equipment and the whole assembly. Glass apparatus and stirrer containers can be damaged or shattered by this. It can cause injury to the operator, as can the rotating stirring tool. If vibration of the equipment is noticed, the speed must be reduced immediately in all cases until the vibration ceases. In this case exchange the stirring tool for one without imbalance or remedy the cause of the imbalance.

Operating with a freely rotating shaft end is dangerous. Therefore for safety reasons the stirrer tool is permitted to project over the upper edge of the housing only when the machine is not running. For correct operation, the rubber diaphragm must always be completely closed. Take care to ensure that the shaft never runs directly in the rubber diaphragm and any friction with the rotating parts (stirrer shafts) is excluded.



### Correct Use

Stirrers in the EUROSTAR series are suitable for stirring and mixing liquids with low or high viscosity. They are designed for use in the laboratory. For correct use the machine must be fixed to a stand.

### **Unpacking**

Please unpack the machine carefully and check for any damage. It is important that any damage which may have occurred during transport be ascertained when unpacking. If applicable, a fact report must be faxed immediately to 800-922-4361. In certain circumstances it may be necessary to investigate immediately (post, rail or freight forwarder). The guarantee covers: One EUROSTAR stirring machine, one extension arm, one hexagonal socket screw, one hexagon socket offset screw key and operating instructions.

### **Useful Facts**

In buying this machine you have chosen a high quality product. Ease of use is guaranteed with its handy shape and simple operation. The housing offers protection against ingress of liquids. The materials used and their precise identification make recycling possible and simple, and enables re-use of the parts. The speed can be infinitely adjusted between 50 and 2000 rpm. The machine can be operated continuously and warms up during operation. The generously proportioned cooling surfaces enable distribution and transference of heat to be as even as possible. The two metre long mains lead makes it possible to work on stands - even with high glass apparatus under vapour extraction hoods - without extension leads. The precision stirrer shaft is designed as a hollow shaft to allow the stirrer shanks to be inserted.

### **Drive**

The speed of the EUROSTAR stirrers can be infinitely adjusted by electronic means. The ball bearing equipped DC motor (protection type IP 44) has a quiet synchronous belt drive. The motor is controlled via a computer-controlled speed regulator using pulse-width modulated voltage (PWM). The whole drive unit is maintenance-free.

### **Motor Protection; Safety Devices**

The machine is suitable for continuous operation. The motor current is electronically limited. The machine has an anti-stall and anti-overload system. If a fault occurs, a safety circuit immediately switches off the motor permanently via a relay. A fault is registered if the safe functioning of the machine is compromised. A fault is always indicated by illumination of the yellow signal light (C) at the front.

Please try switching the machine off and on again to see if operations can continue. If the fault does not clear after a reasonable interval, please call our Technical Department.

## Motor Protection; Safety Devices (continued)

<u>Versions</u> (Fig. 2)	EUROSTAR Digital EUROSTAR Digi-Visc EUROSTAR Power Digi-Visc EUROSTAR Power Control-Visc
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At the same time as the yellow signal light comes on, further details of the fault are shown by a fault code in the LCD display (!):

ER3: Internal temperature too high - Generally this fault can only occur if the permitted environmental temperature is exceeded. *Remedy*: Switch off machine and allow to cool; switch on again.

ER4: Speed fault - This fault is indicated if the output shaft is locked or the speed was higher than permitted. If there are jerky loads which exceed three times the nominal torque, the machine switches itself off as a safety precaution. *Remedy*: Check whether the output shaft is locked due to an external cause. If it is, switch the machine off and ensure that the shaft can rotate freely. If not, switch the machine off without taking further steps. Then switch the stirrer on again.

If any other fault code is indicated, please initially check whether operations can be continued. If the fault cannot be rectified by the means described, contact our Technical Service Department. In each case, we need to know which fault code was indicated. This makes fault-finding easier and allows us to make an initial diagnosis.

## Speeds-Normal Operations

*Speed-regulated (no variation in speed)*

The speed is monitored and regulated by computer control. The NORMAL value is constantly compared with the ACTUAL value of the output shaft and variations corrected. This guarantees a constant speed even if the viscosity of the substance being stirred changes.

Fluctuations in mains voltage within the permitted tolerance range have no effect on the quality of regulation and constancy of speed.

<u>Versions</u>	EUROSTAR Basic EUROSTAR Power Basic
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The speed is set using the front knob (B). During normal operations the speed value on the scale corresponds to the speed of the output shaft in revolutions per minute (rpm).

<u>Versions</u>	EUROSTAR Digital EUROSTAR Digi-Visc EUROSTAR Power Digi-Visc EUROSTAR Power Control-Visc
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The speed is set with the front knob (B). The ACTUAL value is indicated directly in rpm (1/min.) on the LCD display (A). The NOMINAL value set corresponds to the ACTUAL value.

## Speed-Overload Operation

*Current - regulated (speed variation possible)*

The stirrer can deliver doubled output for a short time to even out load peaks which could, for instance, occur if solid or semi-pourable agents are added. If operations continue in the overload range for a long time (e.g. process-related increase in viscosity), the speed is reduced until the stirrer torque corresponds to the normal torque of the machine. The possible speed is continually adapted to operating conditions, guaranteeing that speed is as close as possible to the NOMINAL speed set.

To protect the machine from overloading, the speed is reduced if the machine has been operating for some time in overload mode. The NOMINAL speed (scale value) set then does not correspond to the ACTUAL speed of the output shaft. This condition is indicated by flashing of the yellow control light (C) (overload operation).

A distinction is made here between two different conditions:

-Set Value=Process Value (flashing): (Fig. 3)

The machine is already running in the overload range, but the NOMINAL speed (SV) does not yet correspond to the ACTUAL speed (PV). This condition is maintained so long as neither the motor current nor the temperature exceed the permitted limit values.

Set Value =Process Value (flashing): (Fig. 5)

The machine is running in the overload range, speed is reduced. The ACTUAL speed of the stirrer shaft (PV) is smaller than the NOMINAL speed set (SV). The ACTUAL speed is regulated by output. The machine can be operated permanently in this condition provided the output shaft is not stalled. The indicator is extinguished when the load is reduced accordingly or the NOMINAL speed is adapted to the possible ACTUAL speed. If there is a fluctuating load which is over double the nominal torque, the speed is reduced immediately. The status indicator then shows the second condition (SV>PV flashing).

If the temp-rotary knob is set precisely to the rated temperature, the medium does not reach the rated temperature owing to a drop in temperature between heating plate and medium.

The **rated temperature** is set on the **ETS-D**. When using the ETS-D, there is no overshooting of the medium temperature.

## Function Stirring

The stirring function is started and stopped by its corresponding switch. The motor speed is set on the rotary knob with its dial from 1 to 10. If the motor is switched on, it runs to the speed set on the rotary knob, and the LED beside the imprint turns green.

The dial from 1 - 10 conforms with a speed range from 50 -1100 1/min. When idling, the speed is 1100 1/min at maximum setting of the rotary knob (right-hand stop).

If the viscosity increases during the process, the speed drops a little. If the viscosity decreases, e.g., due to adding fluid media, the speed increases a little. By resetting the rotary knob, both of these cases can be balanced, as long as the torque does not exceed its maximum.

Please note that the main fluctuations within the permissible tolerance also affect minor fluctuations of the speed.

## Maintenance and Cleaning

The Chemglass Analog Hot Plate Stirrer is basically maintenance-free. It is subject only to the natural wear and tear of components and their statistical failure rate.

When ordering spare parts, please give the manufacturer number shown on the type plate, the machine type, and the name of the spare part. Please send in equipment for repair only after it has been cleaned and is free of any materials which may constitute a health hazard. To remove, use the following:

Dyes	Isopropyl Alcohol
Construction materials	Water Containing Tenside/ Isopropyl Alcohol
Cosmetics	Water Containing Tenside/ Isopropyl Alcohol
Foodstuffs	Water Containing Tenside
Fuels	Water Containing Tenside

For materials which are not listed, please request information from Chemglass. Wear the proper protective gloves during cleaning of the devices. Electrical devices may not be placed in the cleansing agent for the purpose of cleaning. Before using a non-recommended method for cleaning or decontamination, the user must ascertain with the manufacturer that this method does not destroy the instrument.

## Torque Indicator

With the stirrer machines EUROSTAR digi-visc, EUROSTAR power digi-visc and EUROSTAR power control-visc it is possible on the basis of the integrated torque trend measurement to indicate the torque acting on the stirrer shaft on the LCD display. In addition, the torque value on the EUROSTAR power control-visc is displayed via the serial interface and on the EUROSTAR digi-visc and EUROSTAR power digi-visc via the analogue output. Absolute torque measurement is not possible with these machines. By touching the illuminated key (F) "Mode" (for approx. 1 sec) the LCD display can be changed over to show the torque value in Newton centimetres (Ncm). (Fig.5). Only the relative change in torque in relation to a starting point determined by the user is measured, indicated and output. To obtain the most precise values possible in torque trend measurement it is necessary for the machine to have achieved its operating temperature (pre-running time 10-15 min).

## Interfaces and Outputs

The machines in the EUROSTAR power type series are equipped with a 15-pin SUB-D connector on the back. Depending on the option selected, the pins are supplied with analogue and/or serial signals.

### - Analogue Output

(all versions EUROSTAR power and EUROSTAR digi-visc)

On the pins with analogue signals there are voltage values for the measurement of speed and torque.

- (9) Torque measurement 1 VDC/100Ncm
- (10) Analogue GND
- (15) Speed measurement 1 VDC/1000 rpm

### -Serial interface RS 232 (V24)

(only version EUROSTAR power control-visc)

The serial interface on the connector can also be used on the machine version EUROSTAR power control-visc to control the machine externally using a computer and suitable applications program.

### Configuration of serial interface RS 232 C

- The functions of the interface connections between the stirrer machine and the automation system are chosen from the signals specified in EIA standard RS232 C in accordance with DIN 66 020 Part 1.
- For the electrical characteristics of the interface and the allocation of signal status, standard RS 232 C applies in accordance with DIN 66 259 Part 1.
- Transmission procedure: asynchronous character transmission in start-stop mode.
- Type of transmission: full duplex.
- Character format: character representation in accordance with data format in DIN 66 022 for start-stop mode. 1 start bit; 7 character bits; 1 parity bit (even); 1 stop bit.
- Transmission speed: 9600 bit/s.
- Data flow control: hardware handshake RTS/CTS

## Interfaces and Outputs (continued)

RTS: (Pin 7) LOW (positive voltage): PC may send  
RTS: (Pin 7) HIGH (negative voltage): PC may not send  
CTS: (Pin 8) LOW (positive voltage): PC ready to receive  
CTS: (Pin 8) HIGH (negative voltage): PC not ready to receive

- Access procedure: data transfer from the stirrer machine to the computer takes place only at the computer's request

### Command Syntax and Format

The following applies to the command set:

- Commands are generally sent from the computer (Master) to the stirrer machine (Slave).
- The stirrer machine sends only at the computer's request. Even fault indications cannot be sent spontaneously from the stirrer machine to the computer (automation system).
- Commands are transmitted in capital letters.
- Commands and parameters including successive parameters are separated by at least one space (Code: hex 0 x 20).
- Each individual command (incl. parameters and data) and each response are terminated with Blank CR Blank LF (Code: hex 0 x20 hex 0x0d hex 0x20 hex 0x0A) and have a maximum length of 80 characters.
- The decimal separator in a number is a dot (Code: hex 0x2E).

The above details correspond as far as possible to the recommendations of the NAMUR working party (NAMUR recommendations for the design of electrical plug connections for analogue and digital signal transmission on individual items of laboratory control equipment, rev. 1.1).

The NAMUR commands and the additional specific Chemglass commands serve only as low level commands for communication between the stirrer machine and the PC. With a suitable terminal or communications program these commands can be transmitted directly to the stirrer equipment. The following table summarises the (NAMUR) commands understood by the Chemglass control equipment. Abbreviations used: X=4:speed; X=5:torque.

### Ramp Commands

The Chemglass stirrer machines with integrated serial interface offer the great advantage in ramp mode that the speed ramps which the stirrer machine is supposed to work off are stored in the stirrer machine and not in the PC.

Through the Chemglass specific RMP\_LOOP\_SET command there is even the possibility of transmitting an endless ramp to the stirrer machine.

NAMUR Commands	Function
IN_PV_X X=4; 5	Read Actual Value
OUT_SP_Xn X=4	Set Actual Value To n (Maximum Value: 1999)

<b>NAMUR Commands</b>	<b>Function</b>	<b>NAMUR Commands</b>	<b>Function</b>
IN_SP_X X=4	Read actual value input	RMP_IN_X X=4	Read current segment number of ramp. If ramp not started:0
START_X X=4	Switch on machine (remote) function (Indication: remote)	RMP_IN_X_y	Read end value (n) and ramp segment duration (hh:mm:ss) for ramp segment y.
STOP_X X=4	Switch off machine function. The variable set with OUT_SP_X remains. Includes the command RMP_STOP, (indication: remote)	RMP_OUT_X_yn (hh:mm:ss) X=4	Set end value (n) and ramp segment duration for ramp segment y.
RESET	Switch to normal operation. Only possible if the speed control is set to n<60.	RMP_START_X X=4	Switch on ramp function starting with ramp segment no. 1. Only possible after previous START_X. After RMP_STOP_X, however, START_X is not necessary.
STATUS_X	Status output 0: manual operation without interruption; 1: automatic operation Start (without interruption); 2: automatic operation Start (without interruption) <0: fault code: -83: parity fault -84: unknown command -85: incorrect command sequence -86: invalid nominal value -87: insufficient memory	RMP_STOP_X X=4	Switch off ramp function. Nominal value=0. (Ramp remains, ie ramp can be started again with RMP_START_X).
		RMP_PAUSE_X X=4	Halt ramp function. Freeze current nominal value and current ramp segment time.

<b>NAMUR Commands</b>	<b>Function</b>
RMP_CONT_X X=4	Continue ramp function. (After Previous RMP_PAUSE_X).
RMP_RESET_X	Switch off ramp function and cancel all previously input ramp segments.
RMP_LOOP_SET_X X=4	Works off ramps in a loop
RMP_LOOP_RESET_X X=4	End ramp loop
IN-TYPE	Request laboratory machine identification
IN_NAME	Request designation
OUT_NAME	Output designation name (max. 6 characters)

**-PC 5.1 Adapter Chemglass-Control (Fig. 9)**

For machine types EUROSTAR power an adaptor cable is available as an accessory. It splits up analogue and serial signals.

The analogue output signals are placed on a 7-pin connector in accordance with the NAMUR recommendation, the serial signals on a 9-pin Sub-D connector (RS 232 C).

(2) Torque	(2) R X D
(3) Analogue GND	(3) T X D
(5) Speed	(5) RS 232 GND
	(7) RTS
	(8) CTS

**-PC 1.2 Adapter**

This adapter is required to connect the 9-pin connector to an 8-way serial interface (25-pin plug).

**-PC 2.1 Cable**

This cable is required to connect the 9-pin connector to a PC.

**-AK 2.1 Cable**

This cable is required to connect the 7-pin connector to a chart recorder (4mm pin plug).

**-AK 2.2 Cable**

This cable is required to connect the 15-pin connector to a chart recorder (4mm pin plug).

### **Commissioning**

For correct use, the stirrer machine must be fixed with a cross sleeve (eg R181) to a stable stand (eg R1822). The stirrer container should always be fixed with a tensioner (eg RH1) for safety reasons.

### **Mounting The Extension Arm**

For diagram see (Fig. 10)

The extension arm (X) has a step at its end with a cross hole. This end is used to insert the extension arm into the hole on the back of the machine. To do this, the cross hole in the extension arms must point upwards. It must be brought into alignment with the hole in the fixing rib on the back of the machine. To do this, press the extension arm until it catches in the hole. Please do not use force to do this. If it proves difficult to insert the extension arm, light oiling may help. The hexagonal socket screw (Y) used for fixing is inserted in the hole in the housing from above. The screw is tightened using the hexagon socket offset screw key (Z). Check that the extension arm is firmly seated. The screw may loosen with vibration. Therefore as a precaution check from time to time that the extension arm is still securely attached. If necessary tighten the hexagonal socket screw. You can also secure the hexagonal socket screw with adhesive, but you are then unable to release the connection later.

### **Switching on the Machine**

Check whether the voltage given on the type plate corresponds to the available mains voltage. The socket used must be earthed (fitted with earth contact). If these conditions have been met, the machine is ready to operate when the mains plug is plugged in. If these conditions are not met, safe operation is not guaranteed and the machine could be damaged.

After switching on the mains switch (O) in position "I", the machine carries out a self-test. For machines with LCD displays (A), this is shown by the flashing of all segments. After the self-test lasting several seconds, the output shaft starts to rotate. A green control light (E) signals the operating status "ON".

During commissioning of the machine the output shaft starts to run at the last speed set. Therefore, check the setting of the control knob. Also, ensure that the speed set is suitable for the test texture selected. If in doubt, set the speed knob (B) to the lowest speed (left-hand position).

### **Output Shaft**

The clamping chuck and output shaft permit all standard commercial stirrer tools up to 10mm diameter to be gripped and screwed in. The opening on the top side of the housing is closed with a slotted rubber diaphragm. It is, however, possible for stirring shafts to push out over the top edge of the housing eg during change of container.

### Output Shaft (continued)

If it becomes necessary - depending on the layout of the equipment - to allow the shaft end to project over the edge of the housing during operations, the rubber diaphragm should be removed. Instead a stirrer shaft cover, which can be obtained as an accessory, must be placed on the housing. If the stirrer shaft cover is removed again, the rubber diaphragm must be pressed into the housing opening again so that this is closed. This is the only way of ensuring safe working and preventing any fluids from penetrating the equipment.

### Maintenance and Cleaning

The stirrer is maintenance-free. It is subject only to the natural wear and tear of components and their statistical failure rate. When ordering spare parts, please give the manufacturing number shown on the type plate, the machine type and the name of the spare part. Please send in equipment for repair only after it has been cleaned and is free from any materials which may constitute a health hazard. Only use water with a detergent additive containing a surfactant for cleaning, or for heavier soiling Isopropyl Alcohol.

### Accessories

RR 2723	Telescopic stand
R 260	Cross Sleeve
RH2	Tensioner
R301	Stirrer shaft protection
PC 1.2	Adapter
PC 2.1	Cable
PC 5.1	Chemglass control adaptor
AK 2.1	Cable
AK 2.2	Cable

### Technical Data

Speed range under nominal load:	<b>min<sup>1</sup></b>	50-2000
max. torque stirrer shaft:	<b>Ncm</b>	60
Permitted on-time:	<b>%</b>	100
Speed setting:		Speed regulator with pulse-width modulator
Speed indicator:		Liquid crystal - indicator
		Indication range -99 to +199.9
Nominal voltage:	<b>VAC</b>	230
Frequency:	<b>Hz</b>	50/60
Input power:	<b>W</b>	130
Output power:	<b>W</b>	105

### Technical Data (continued)

Overall efficiency:		0.71 units
Protection type to DIN 40 050:		IP42
Excess voltage category:		<b>I</b>
Contamination level:		2
Protection at overload:		Motor current limitation
Fuses (on main plate):	<b>A</b>	4 T
Drive:		DC motor with 1 stage toothed belt drive
Ambient temperature:	<b>°C</b>	+5 to +40
Ambient humidity: (rel)	<b>%</b>	80
Operating position:		on stand, clamping chuck pointing down
<b>Variations In Speed:</b>		
electronic precision of setting :	<b>min<sup>1</sup></b>	+2
Precision of indication (on average):	<b>digit</b>	±2
Speed variation during load change 0-50%:	<b>min<sup>1</sup></b>	load < or = 3
Measurement range:		Ncm 0-60
		absolute +8% from end value
		precision
Protection measures:		relative +1.7% from end value
		precision

Class	Protection device	Recommended Use
0	No additional protection	Application for machines for which failure of the control system presents no danger.
The operating condition must be monitored at regular intervals		

Maximum stirring quantity-water: 40L

For viscosity: HV

Viscosity	mPa - s	
VLV very low viscosity	0...100	Water up to thin-boiled oil
LV low viscosity	100...1000	Thin-boiled oil up to thick-boiled oil
MV medium viscosity	1000...10000	Thick-boiled oil up to honey at approx. 20°C
HV high viscosity	10000...100000	Honey at approx. 20°C up to inks/dyes

### Technical Data (continued)

Clamping chuck clamping range:	<b>m m</b>	0.5-10
Hollow shaft internal diameter:	<b>m m</b>	11
Extension arm:	<b>m m</b>	16 x 220 long
Housing:		Al diecasting, thermo plastic
Dimensions (WxDxH) without extension arm:		80 x 190 x 205
Weight with extension arm and clamping chuck:	<b>kg</b>	3.8

### Associated standards and regulations

Associated EU guidelines:

EMV guidelines: 89/336/EC

Machine guidelines: 89/392/EC

Construction in accordance with the following safety standards:

EN 61 010-1 /VDE 411-1	IEC 1010-1
EN 50 082-1	UL 3101-1
EN 55 014-1	CAN/CSA C22.2 (1010.1)
EN 60 555-2, -3	
EN 292-1, -2	
EN 414	

### Guarantee

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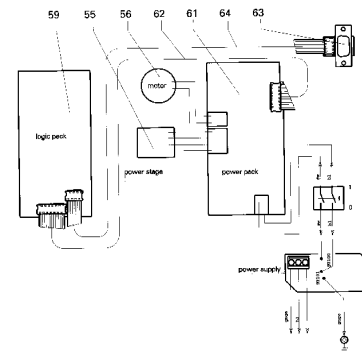
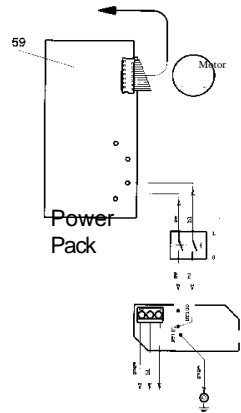
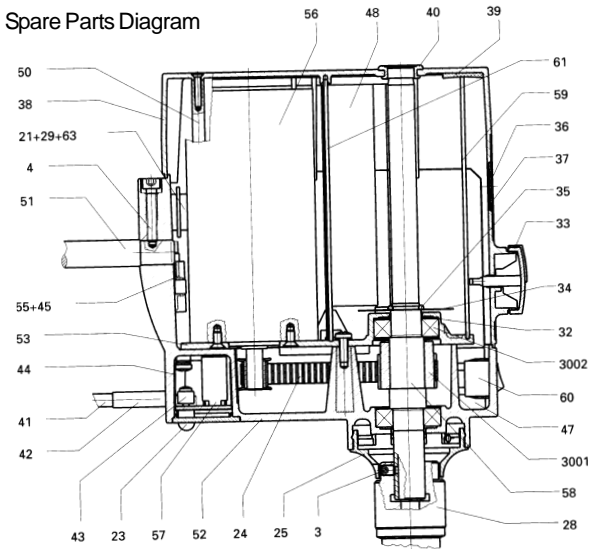
### Spare Parts List

Item	Name	Item	Name
3	Headless pin	37	Front plate
4	Cylindrical screw with hex. socket	38	Plastic housing
21	Locking set	39	Feed belt
23	Cover-mains input	40	Stirrer shaft cover
24	Toothed belt	41	Connection lead
25	Transition piece	42	Insulation tube
28	Chuck	43	Cable strap
29	Covering flap	44	Insulation foil
32	Ball bearing compensation washer	45	Insulation tube
33	Operating knob	47	Insulation foil
34	Impulse disc	48	Insulation foil
35	O-ring, paracril	50	Securing stand
36	LCD cover	51	Extension
		52	Plastic Housing
		53	Internal part

### Spare Parts List (continued)

Item	Name
55	Performance level
56	DC motor
57	Printed Circuit Connector
58	Output shaft
59	Printed Circuit Regulator
60	Rocker switch
61	Printed Circuit
62	Ribbon Cable
63	Printed Circuit connector 8/15 pin
64	Ribbon cable
3001	Super torque disc
3002	Deep groove ball bearing (special grease)

Spare Parts Diagram



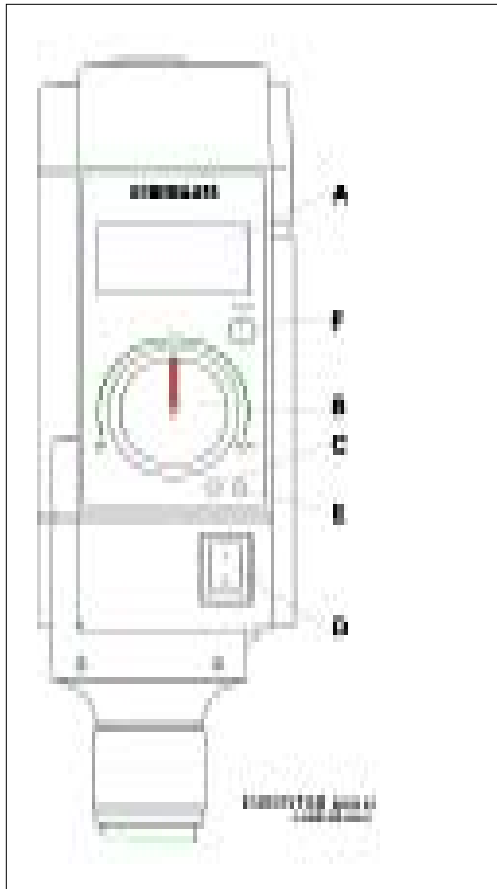


Fig. 1



Fig. 2

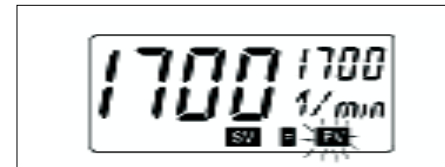


Fig. 3



Fig. 4

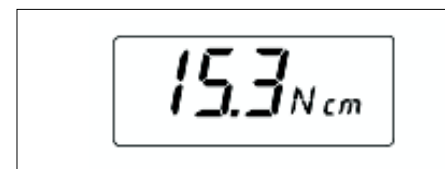


Fig. 5

