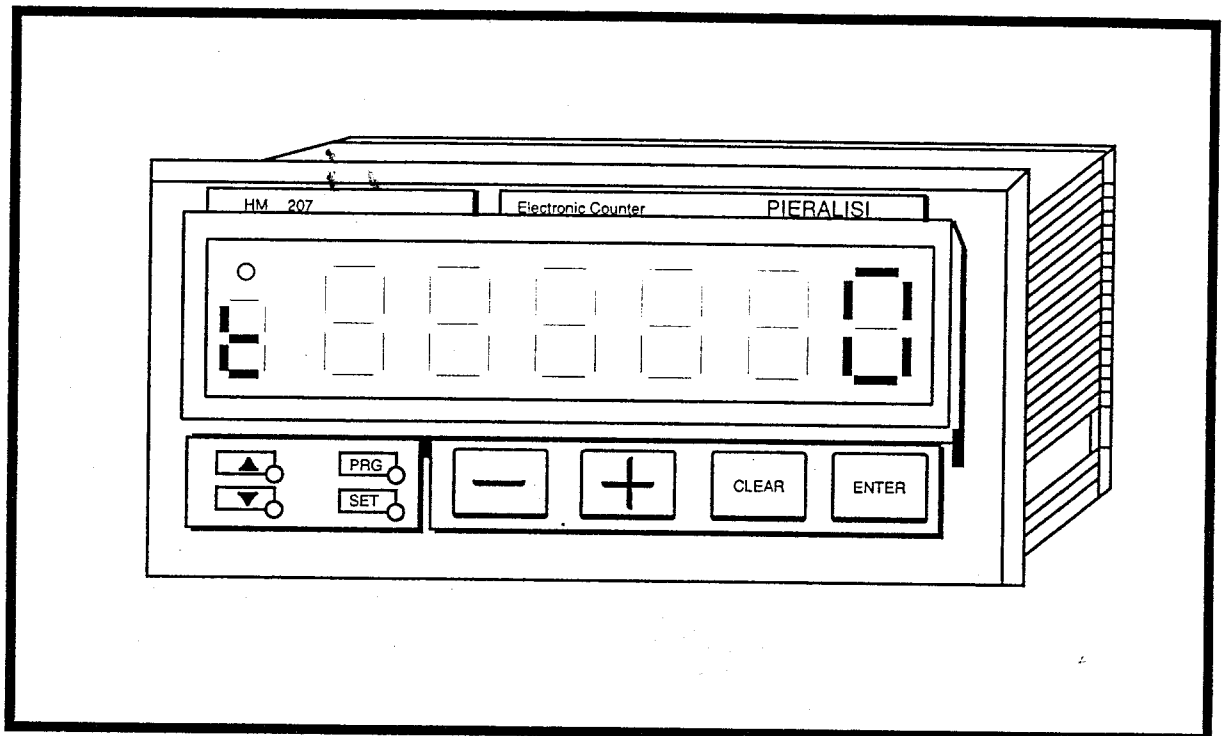

PIERALISI

RPM - METER FOR DECANTERS



SERIE
SERIES

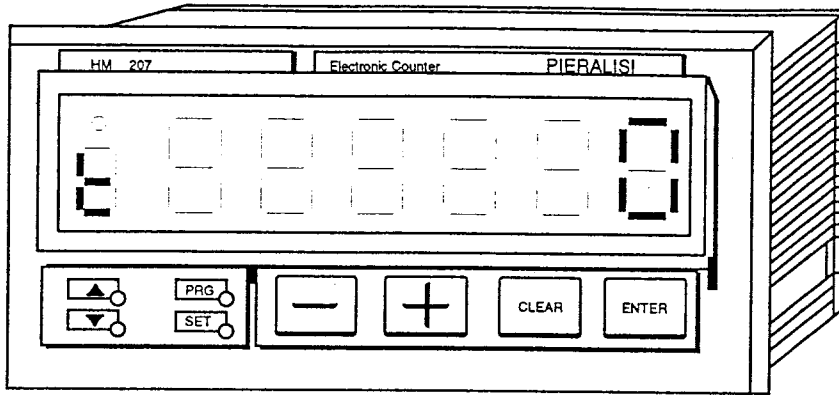
HM 207.16

ENGLISH
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Technical Guide
Instructions for Assembling- Use- Maintenance

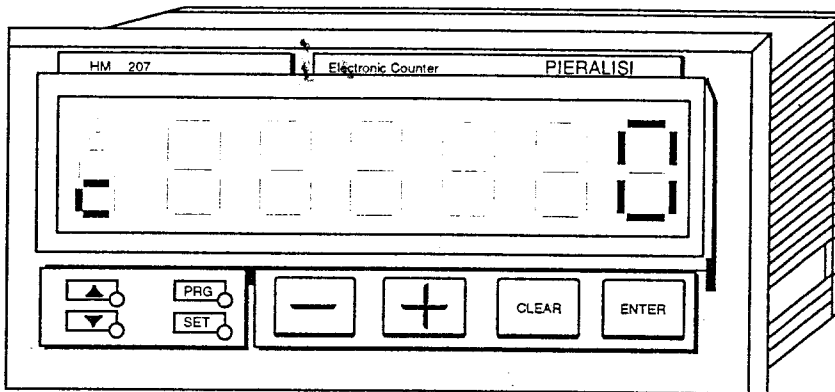
RPM - METER HM 207.16 FOR DECANTERS

The following pages are displayed:



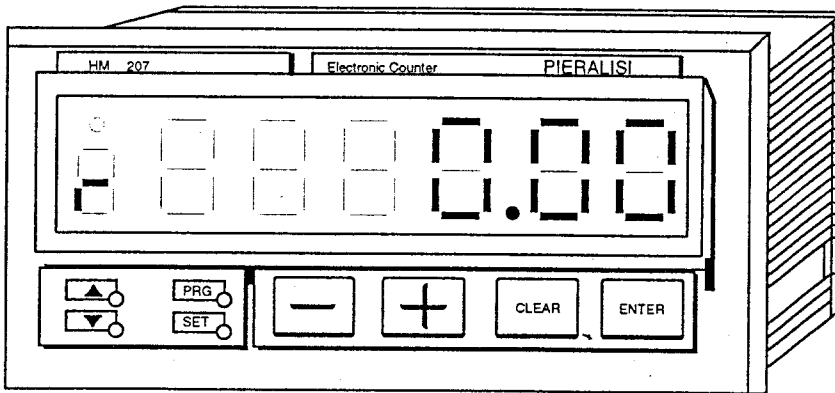
Page 1

Press the + key to go to Page 2



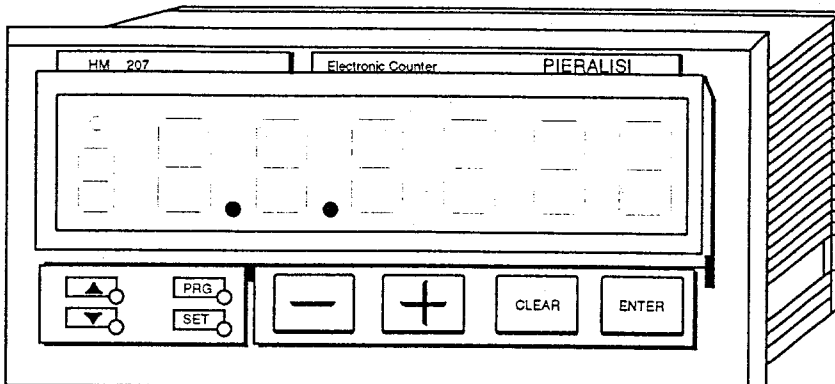
Page 2

Press the + key to go Page 3



Page 3

Press the + key to go to Page 4



Page 4

Press the + key to go to Page 1

RPM - COUNTER

Each decanter manufactured by Pieralisi is delivered with an electronic rpm-meter, to meet with the elevated control and safety standards set by Pieralisi.

This rpm-meter carries out the following functions:

- 1) - Control of bowl plugging (during start-up) and rpm decrease (at full operation) by means of only one sensor, NAMUR type, installed to detect the bowl speed.
- 2) - Control of bowl plugging (during start-up) and rpm on the gearbox input shaft by means of two sensors, NAMUR type, installed to detect the bowl speed and the scroll speed. The differential speed between bowl and scroll is calculated.
- 3) - Control of bowl plugging (during start-up) and rpm on the gearbox input shaft by means of three sensors, NAMUR type, installed to detect the bowl speed and the scroll speed (of the latter also the rotational direction is controlled: positive, if the scroll rotates in the same direction as the bowl, negative, if it rotates in the opposite direction of the bowl). The differential speed between bowl and scroll is calculated.

All the above functions are performed by the two programmable outputs **U1** (terminals 8+9) and **U2** (terminals 8+10) and relevant interfacing relays **R30** e **R31**.

When the first output **U1** (terminal 9) is activated, the centrifuge is enabled to be started up thanks to the contact **R30** (normally open) which is closed for a programmable time **tn**.

If the minimum speed level **d** (10 rpm), is not reached during time **tn**, either because the decanter is blocked up or excessively braked, output **U1**, will be disabled, over **R30**, the centrifuge will be stopped and red signal lamp "BLOCKED BOWL" will light up.

R30, which is activated by **U1**, has the same function for all the three different installation modes.

The second output **U2** (terminal 10), acts over one normally open contact of **R31** on the interlockings series enabling the feed pump, and over one normally closed contact of **R31** on the alarm system.

U2 is programmed differently for the different installation modes.

U2 is enabled or disabled according to the differential speed "**r**", between bowl and scroll.

The rpm-meter calculates "**r**" as follows:

$$r = \frac{|t - c|}{rt} \quad \text{where}$$

t= bowl rpm shown on the first display page

c= scroll rpm shown on the second display page

rt= gearbox reduction ratio (this programmable parameter varies according to the different decanter types)

$rt = 25$ for centrifuges BABY 1 and BABY 2

$rt = 160$ for centrifuges MAJOR 1-2-3 and FP600 - 600RS - 6002RS

$rt = 59,7$ for centrifuges JUMBO 1-2-3

$rt = 92,4$ for special decanters of the FP600 - 600RS - 6002RS series

$rt = 87$ for centrifuges GIANT 2

For this reason, according to the three different installation modes, the values of thresholds \dot{A} and \dot{d} must be programmed in order to achieve correct functioning of the U_2 output controlling relay R_{31} .

With standard programming of parameter "S" = 351535, U_2 performs according to the following example:

- SET-UP values:

$s = 351535$

$t1 = 2$

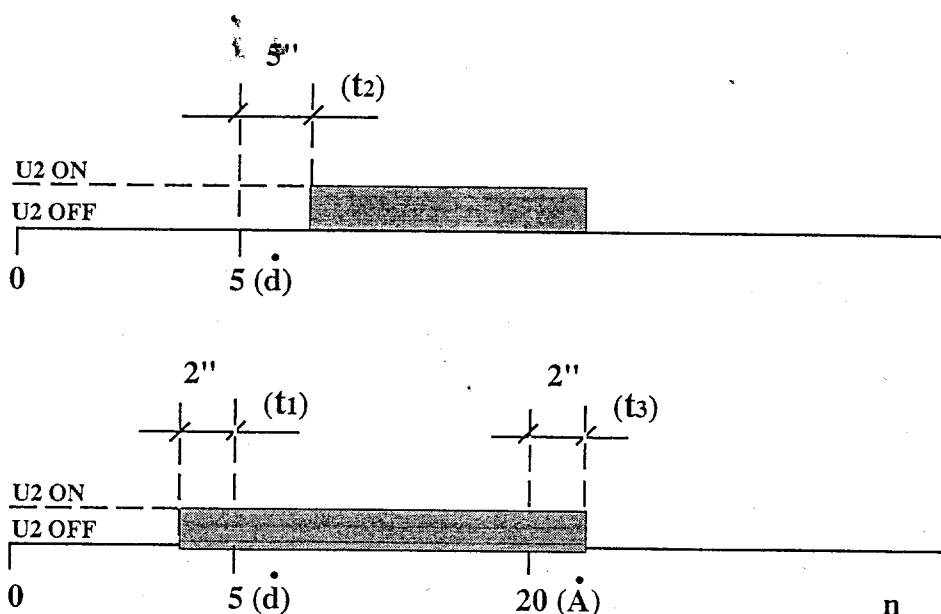
$t2 = 5$

$t3 = 2$

$\dot{A} = 20$

$\dot{d} = 5$

Whenever r is a value between 5 and 20, U_2 is enabled and relay R_{31} is activated.



In this case r starts from 0, and increases during the decanter start-up. As soon as the value 5 (\dot{d} value), is exceeded, after an interval of 5" (value of t_2) output U_2 is enabled. From that moment on, $5 < r < 20$ U_2 will always be enabled. As soon as r becomes less than 5 for an interval longer than t_1 , or as soon as r exceeds 20 for an interval longer than t_3 , output U_2 is disabled and R_{31} is deactivated.

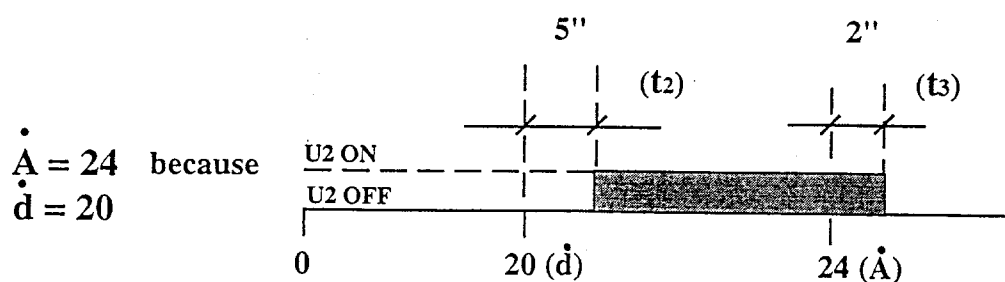
1) - One sensor system

the following formula still applies:

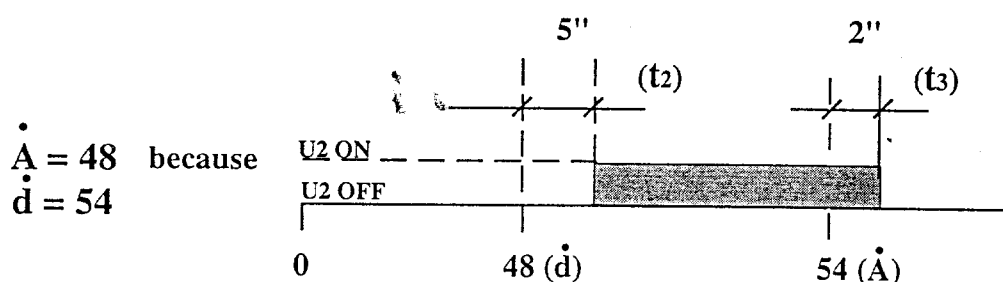
$$r = \frac{|t - c|}{rt} \quad \text{but without the scroll rpm we have:}$$

$$r = \frac{|t - 0|}{rt} \begin{cases} r = \frac{|3500 - 0|}{160} = 21,8 \quad \text{Series MAJOR/FP600} \\ r = \frac{|3000 - 0|}{59,7} = 50,2 \quad \text{Series JUMBO} \end{cases}$$

So for series series MAJOR/FP600 program as follows:



whereas for series JUMBO



in order to ensure that at normal conditions r stays in the window defined by, the values of (\dot{d}) and (\dot{A})

2) - Two sensors systems

from formula:

$$r = \frac{|t - c|}{rt}$$

we derive

$$r = \frac{|3500 - 940|}{160} = 16 \quad \text{2 phase MAJOR series}$$

$$r = \frac{|3500 - 1580|}{160} = 12 \quad \text{3 phase MAJOR series}$$

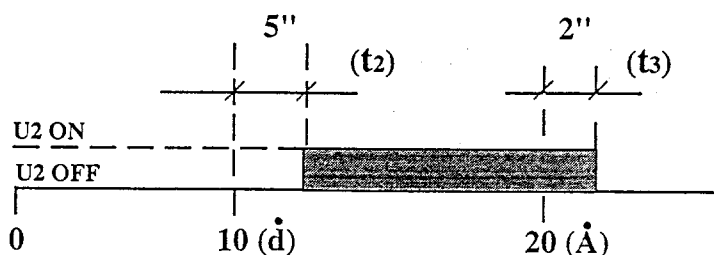
$$r = \frac{|5100 - 5500|}{25} = 16 \quad \text{BABY series}$$

$$r = \frac{|3000 - 2044|}{59.7} = 16 \quad \text{2 phase JUMBO series}$$

$$r = \frac{|3000 - 2283|}{59.7} = 12 \quad \text{3 phase JUMBO series}$$

Therefore programming $\dot{A} = 20$ $\dot{d} = 10$ Gives a correct set-up for all centrifuges.

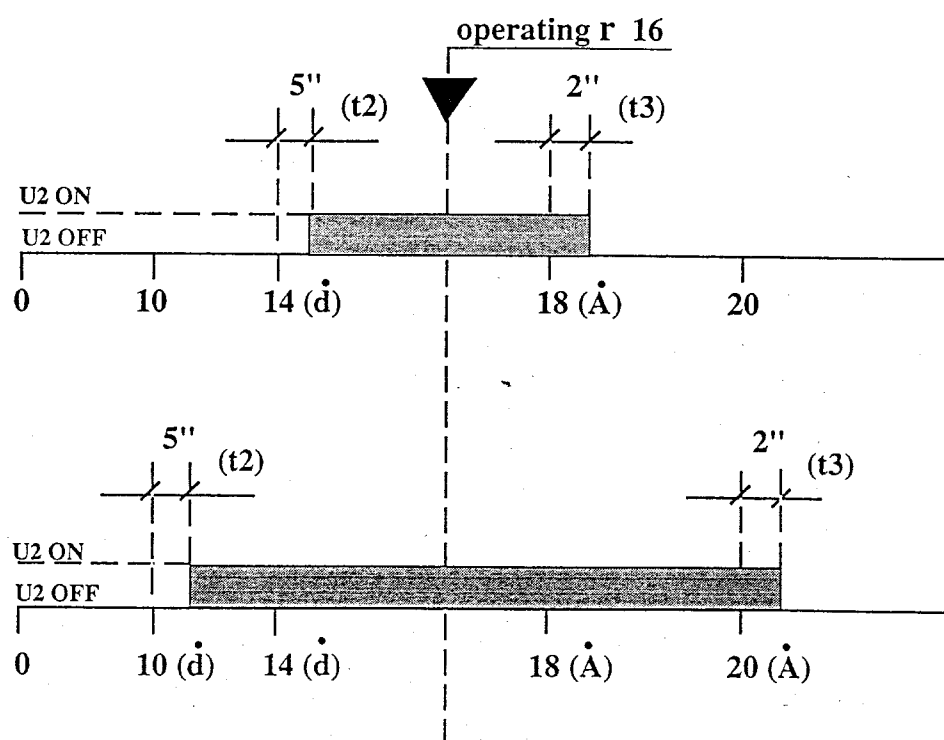
All the values calculated so far are within this window:



If, however, a stricter control is required, that means, in all those cases in which for optimum operation it is important to have a more immediate reaction of U_2 also in cases of slight slippings of the scroll or slight variations of the differential speed, a narrower operating window must be set around the normal r value.

For example: with $r = 16$
 we set $\dot{A} = 18$ and $\dot{d} = 14$
 or $\dot{A} = 20$ and $\dot{d} = 10$

the different behaviour of U_2 and R_{31} (and therefore the feed pump) becomes evident:



The narrower the operating window $\dot{d} \div \dot{A}$, the preciser is the control of the differential speed and the quicker is the action of the rpm-counter on the main motor.

3) - Three sensor system

This system is normally installed on decanters with reducer input speed variator able to vary the scroll speed, and as a consequence, also the differential speed between scroll and bowl.

The third sensor is installed to control if the speed on the gearbox input shaft is positive, with rotation in the same direction as the bowl, or it is negative in case of counter-rotation:

$$r = \frac{|t - (-c)|}{rt} = \frac{|t + c|}{rt}$$

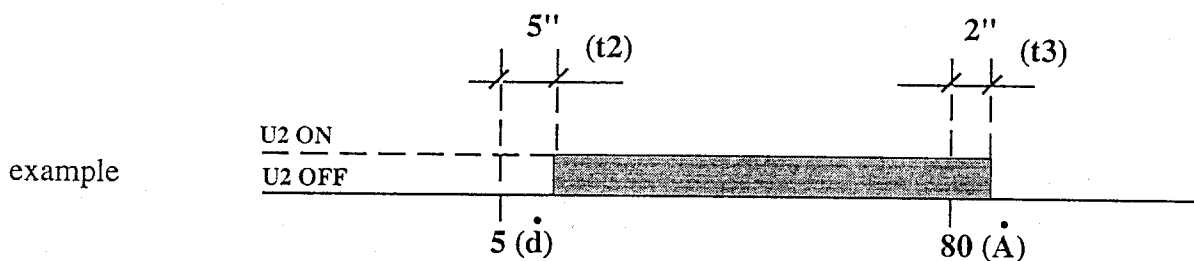
Infact, if we rotate the gearbox input shaft first at + 1000 and than at - 1000, we have:

$$r_1 = \frac{3500 - (+ 1000)}{160} - \frac{2500}{160} = 15,62 \quad \text{Diff. rpm}$$




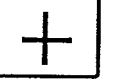




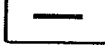






$$r_2 = \frac{3500 - (- 1000)}{160} - \frac{3500 + 1000}{160} = 28,12 \quad \text{Diff. rpm}$$

With the speed variator a large range of differential speed variation is available.


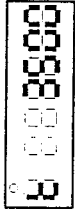








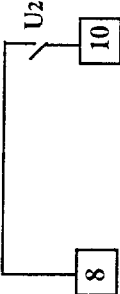
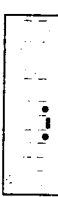
Therefore the values \dot{A} and \dot{d} become very distant between each other.



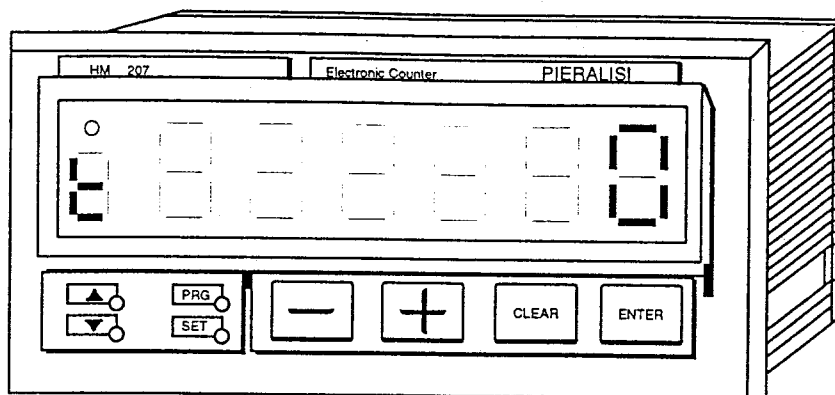
KEYBOARD DESCRIPTION

	GREEN	<p>PRESSING THIS KEY TOGETHER WITH  + PASSWORD GIVES ACCESS TO THE SET-UP PARAMETERS, TO THE HOUR-COUNTER, TO THE dc SETTING OF BOWL AND SCROLL.</p> <p>DURING PROGRAMMING, THIS KEY CONFIRMS THE DISPLAYED DATA AND GOES THE NEXT PARAMETER.</p>
	RED	<p>CANCELS THE DISPLAYED VALUE DURING PROGRAMMING.</p> <p>WHEN THE HOUR-COUNTER IS DISPLAYED, CLEAR + ENTER CANCEL THE VALUE STORED BY THE HOUR-COUNTER.</p>
	BLACK	<p>INCREASES THE SELECTED (BLINKING) PARAMETER EITHER STEP BY STEP OR CONTINUOUSLY DURING DATA INPUTTING.</p> <p>PRESSING THIS KEY DURING NORMAL OPERATION DISPLAYS THE VARIOUS PAGES (PAG. 1 + PAG. 4)</p>
	BLACK	<p>SELECTS THE NEXT DIGIT ON THE RIGHT DURING DATA INPUTTING.</p> <p>PRESSING THIS KEY TOGETHER WITH  + PASSWORD GIVES ACCESS TO THE SET-UP PARAMETERS, THE HOUR COUNTER, THE DC SHOWN VALUES OF BOWL AND SCROLL.</p>
	LED PRG	LIT DURING SET-UP PARAMETERS PROGRAMMING.
	LED SET	<p>LIGHT WHILE PRESSING  + </p> <p>(NECESSARY TO INPUT THE PASSWORD)</p>
	LED	<p>LIT WITH U₁ OUTPUT</p> <p>SEE ALSO  PAGE 4</p>
	LED	<p>LIT WITH U₂ OUTPUT</p> <p>SEE ALSO  PAGE 4</p>
	LED ICF	INDICATES DATA PROGRAMMING FOR SCROLL DURING SET - UP

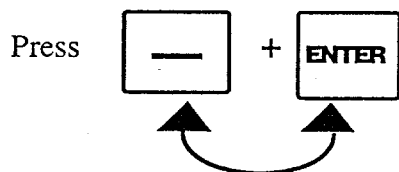
DESCRIPTION OF INPUTS AND OUTPUTS

SIGNAL TYPE	INPUT ACTIVATED	TERMINAL BOARD CONNECTION	DESCRIPTION	DISPLAY WHEN CENTRIFUGE AT REGIME
IMPULSES		2 (NEGATIVE POLE)	INPUT 1 / CLOCK1 - BOWL SPEED	PAG. 1 Page 1  PAG. 1 Page 3  (With $r_f=160$)
		4 (POSITIVE POLE)	INPUT 2 / CLOCK2 - SCROLL SPEED	PAG. 1 Page 2 
IMPULSES		2 (NEGATIVE POLE)	INPUT 3 / CLOCK3 - SCROLL DIRECTION	POSITIVE ROTATION PAG. 1 Page 2 
		5 (POSITIVE POLE)		NEGATIVE ROTATION PAG. 1 Page 2 
CONTINUOUS		7 (PHASE -01 OF 24 AC V)	ENABLES THE RPM-METER FUNCTIONS DISPLAYS SPEED t and c OF r RATIO AND OF $U_1 U_2$ THRESHOLDS	
CONTINUOUS			REACTION DEPENDS ON HOW PARAMETER "P" IS PROGRAMMED.	PAG. 1 Page 4 
CONTINUOUS			REACTION DEPENDS ON HOW PARAMETER "S" IS PROGRAMMED.	PAG. 1 Page 4 

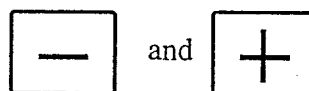
PASSWORDS



Proceed as follows to enter the programmable rpm-area or to display data:



Input the desired **PASSWORD** using correctly keys



then press



USE THE FOLLOWING PASSWORDS:

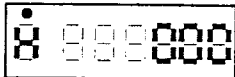
- 207 = TO MODIFY SET-UP VALUES (PROGRAMMING)
- 702 = TO DISPLAY CENTRIFUGE WORKING HOURS
- 456 = FOR BOWL FREQUENCY AND dC
- 654 = FOR SCROLL FREQUENCY AND dC



HOW TO PROGRAM THE RPM-METER

Before programming, input the three-digit-password as follows:

- Press for several seconds the  +  keys at the same time.

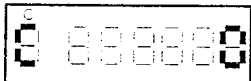


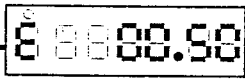

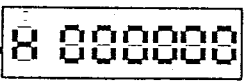




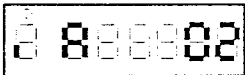
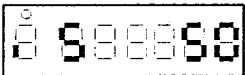
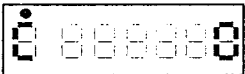




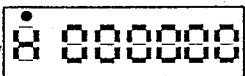
- On the display  appears, waiting for the password to be input.

- Input **207** and confirm with  ; the  led lights up.

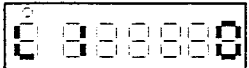
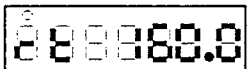

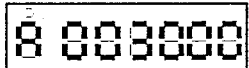

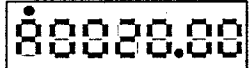

(after each single function presse **ENTER** to confirm and go to next function).




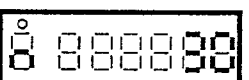
In the following the list of programmable parameters is given, with their PRE-SET values.

FUNCTION	DISPLAY WITH STANDARD VALUES	DESCRIPTION
DECIMAL NUMBERS FOR BOWL RPM DISPLAY		0=MAX. NUMBER AVAILABLE 999999
DECIMAL NUMBERS BOWL FREQUENCY		2= VALUES OF HUNDREDTHS OF HERTZ CAN BE INPUT.
MAXIMUM BOWL FREQUENCY		MAX. FREQUENCY THE SENSOR IS ABLE TO TRANSMIT TO DISPLAY SPEED "n"
MINIMUM BOWL FREQUENCY		THE MINIMUM FREQUENCY TO BE READ. AT THIS FREQUENCY THE DISPLAY INDICATES VALUE "H".
MAXIMUM BOWL VALUE DISPLAY		THIS VALUE IS DISPLAYED WHEN THE MAXIMUM FREQUENCY "F" IS REACHED. IN OTHER WORDS, WHEN F=300 THE DISPLAY INDICATES 9000.
MINIMUM BOWL VALUE DISPLAY		THIS VALUE IS DISPLAYED IN CASE OF MINIMUM FREQUENCY.

FUNCTION	DISPLAY WITH STANDARD VALUES	DESCRIPTION
BOWL CLOCK DUTY CYCLE		ACTIVATION PERCENTAGE OF INPUT I1 COMPARED TO THE SIGNAL LENGTH. IN OTHER WORDS THE RATIO BETWEEN THE SIGNAL LENGTH AND THE TIME WITHOUT SIGNAL (OF THE SENSOR).
BOWL CLOCK CUTOFF FREQUENCY		CUTOFF FREQUENCY OF THE CLOCK INPUT, ABOVE WHICH NO MEASURING TAKES PLACE. THIS VALUE MUST BE \geq MAXIMUM FREQUENCY (NORMALLY AT LEAST 5% HIGHER').
READINGS AVERAGE FOR BOWL CLOCK ACQUISITION		DEFINES AFTER HOW MANY READINGS THE SPEED TO BE ACQUIRED IS CALCULATED (TACHOMETER). THE HIGHER THE NUMBER OF READINGS, THE SLOWER IS THE REACTION TIME TO SPEED VARIATIONS.
BOWL CLOCK AVERAGE IN STABILIZATION		INDICATES AFTER HOW MANY READINGS THE SPEED TO BE DISPLAYED IS CALCULATED DURING THE STABILIZATION PHASE (IF THE VARIATION OF READINGS IS $< \pm 2,5\%$ OF MAX. SPEED).
DECIMAL NUMBERS FOR SCROLL RPM DISPLAY		0= MAX. NUMBER AVAILABLE 999999
DECIMAL NUMBERS SCROLL FREQUENCY		2=VALUES OF HUNDREDTHS OF HERTZ CAN BE INPUT.
MAXIMUM SCROLL FREQUENCY		MAX. FREQUENCY THE SENSOR IS ABLE TO TRANSMIT TO DISPLAY SPEED " n ".
MINIMUM SCROLL FREQUENCY		THE MINIMUM FREQUENCY TO BE READ. AT THIS FREQUENCY THE DISPLAY INDICATES VALUE " n ".
MAXIMUM SCROLL VALUE		THIS VALUE IS DISPLAYED WHEN THE MAXIMUM FREQUENCY " F " IS REACHED. IN OTHER WORDS, WHEN F = 300 THE DISPLAY INDICATES 9000.
MINIMUM SCROLL VALUE		THIS VALUE IS DISPLAYED IN CASE OF MINIMUM FREQUENCY.

FUNCTION	DISPLAY WITH STANDARD VALUES	DESCRIPTION
SCROLL CLOCK DUTY CYCLE		ACTIVATION PERCENTAGE OF INPUT I2 COMPARED TO THE SIGNAL LENGTH. IN OTHER WORDS THE RATIO BETWEEN THE SIGNAL LENGTH AND THE TIME WITHOUT SIGNAL (OF THE SENSOR).
SCROLL CLOCK CUTOFF FREQUENCY		CUTOFF FREQUENCY OF THE CLOCK INPUT, ABOVE WHICH NO MEASURING TAKES PLACE. THIS VALUE MUST BE \geq MAXIMUM FREQUENCY (NORMALLY AT LEAST 5% HIGHER).
READINGS AVERAGE FOR SCROLL CLOCK ACQUISITION		DEFINES AFTER HOW MANY READINGS THE SPEED TO BE ACQUIRED IS CALCULATED (TACHOMETER). THE HIGHER THE NUMBER OF READINGS, THE SLOWER IS THE REACTION TIME TO SPEED VARIATIONS.
SCROLL CLOCK AVERAGE IN STABILIZATION		INDICATES AFTER HOW MANY READINGS THE SPEED TO BE DISPLAYED IS CALCULATED DURING THE STABILIZATION PHASE (IF THE VARIATIONS OF READINGS IS $< \pm 2,5\%$ OF MAX. SPEED).
RATIO DISPLAY ENABLING		0 = DISPLAY OF ABSOLUTE DIFFERENTIAL RATIO BETWEEN THE TWO SPEED VALUES NOT ENABLED. 1 = DISPLAY OF ABSOLUTE DIFFERENTIAL RATIO BETWEEN THE TWO SPEED VALUES ENABLED.
OUTPUT U2 PROGRAMMING		0 = OUTPUT U2 DISPLAYS COMPARISON BETWEEN THE ABSOLUTE DIFFERENTIAL RATIO OF THE TWO SPEED VALUES AND THE PROGRAMMABLE THRESHOLDS. 1 = OUTPUT U2 DISPLAYS COMPARISON BETWEEN SPEED TWO AND THE PROGRAMMABLE THRESHOLDS.
OUTPUT U1 PROGRAMMING		EACH COUPLE OF NUMBERS IDENTIFIES THE TYPE OF CONTACT (FIRST NUMBER) AND THE DEPENDENCE OF OUTPUT U1 RANGE (SECOND NUMBER).
OUTPUT U2 PROGRAMMING		EACH COUPLE OF NUMBERS IDENTIFIES THE TYPE OF CONTACT (FIRST NUMBER) AND THE DEPENDENCE OF OUTPUT U2 RANGE (SECOND NUMBER).
START-UP TIMER		TIME IN SECONDS, ACTIVATED WHEN INPUT 14 IS ON. SERIES JUMBO $t_n = 7$ SERIES MAJOR - BABY = 5 SERIES GIANT = 8
TIMER FOR RANGE 1 (Hd)		TIME OF DELAY, EXPRESSED IN SECONDS, FOR COMPARISON IN RANGE (Hd), WHEN READING ENTERS THIS RANGE.
TIMER FOR RANGE 2 (dA)		TIME OF DELAY, EXPRESSED IN SECONDS, FOR COMPARISON IN RANGE (dA), WHEN READING ENTERS THIS RANGE.
TIMER FOR RANGE 3 (An)		TIME OF DELAY, EXPRESSED IN SECONDS, FOR COMPARISON IN RANGE (An), WHEN READING ENTERS THIS RANGE.

FUNCTION	DISPLAY WITH STANDARD VALUES	DESCRIPTION
INPUT I4 ENABLING		0= SPEED DISPLAY IS ALWAYS ENABLED.
SCROLL/BOWL TRANSMISSION RATIO		TRANSMISSION RATIO BETWEEN SCOLL AND BOWL, NECESSARY TO CALCULATE THE ABSOLUTE DIFFERENTIAL RATIO. BABY =25 MAJOR= 160 JUMBO= 59.7 GIANT= 87
ENABLING FOR THRESHOLDS PROGRAMMING		0= MODIFICATION OF ALARM THRESHOLDS A AND d, IS ENABLED ONLY IN PROGRAMMING MODE.
MAX. BOWL SPEED THRESHOLD		THRESHOLD OF MAXIMUM SPEED USED FOR OUTPUT U1 COMPARISON.
MIN. BOWL SPEED THRESHOLD		THRESHOLD OF MINIMUM SPEED USED FOR OUTPUT U1 COMPARISON.
MAX. SCROLL SPEED OR RATIO THRESHOLD		THRESHOLD OF MAXIMUM SPEED USED FOR OUTPUT U2 COMPARISON. IF U2 =0, THE SET VALUE REFERS TO THE ABSOLUTE DIFFERENTIAL RATIO BETWEEN THE TWO SPEED VALUES.
MIN. SCROLL SPEED OR RATIO THRESHOLD		THRESHOLD OF MINIMUM SPEED USED FOR OUTPUT U2 COMPARISON. IF U2 =0, THE SET VALUE REFERS TO THE ABSOLUTE DIFFERENTIAL RATIO BETWEEN THE TWO SPEED VALUES.

FUNCTION	DISPLAY WITH STANDARD VALUES	DESCRIPTION
SENSITIZATION EXPANSION		<p>0= THE EXPANSION USE NOT QUALIFIED WITH THE U3 OUTPUT TO WHICH IT IS POSSIBLE TO CONNECT THE CENTRIFUGE WASHING ELECTRO-VALVE WHICH OPERATES DURING THE MACHINE STOPPING.</p> <p>1= THE EXPANSION IS QUALIFIED AND THEREFORE THE U3 OUTPUT USE. WITH THIS OPERATION THE TWO FOLLOWING PARAMETERS ARE SHOWED ON THE DISPLAY.</p>
HIGHER THERESHOLD OF BOWL SPEED FOR THE U3 SENSITIZATION		IT SHOWS AND FIXS THE VALUE WHICH, DURING STOPPING, ACTIVATES THE U3 OUTPUT FOR THE ANTIVIBRATION CENTRIFUGE WASHING.
LOWER THERESHOLD OF BOWL SPEED FOR THE U3 SENSITIZATION		IT SHOWS AND FIXS THE VALUE WHICH, DURING STOPPING, ACTIVATES THE U3 OUTPUT FOR THE ANTIVIBRATION CENTRIFUGE WASHING.
CHECK NUMBERS I4 INPUT		<p>IT SETS THE ACQUIRING TIME OF I4 IMPUT. THE FIXED VALUE, MULTIPLIED FOR 5, INPUTS A DELAY TIME OF THE I4 INPUT CHECK. Es. $30 \times 5 = 150 \text{ms}$.</p> <p>THIS MEANS THAT THE SIGNAL INTERRUPTIONS OF THE I4 INPUT WHICH ARE LOWER THAN 150ms. WILL NOT BE CONSIDERED.</p>

After having programmed the last function, the display shows again the same page as before and the prg led is switched off.

SUMMARY OF DEFAULT VALUES FOR PARTICULAR APPLICATIONS

RPM - METER 207.16

PASSWORD "207"

WITH CAMS

WITH DISK FOR BOWL
CAMS FOR SCROLL

BOWL	C	=	0	0
	CF	=	2	2
	F	=	300	150
	E	=	0.5	0.5
	n	=	9000	9000
	H	=	0	0
	dC	=	50	4
	G	=	315	160
	iA	=	02	01
iS	=	50	50	
SCROLL	Ĉ	=	0	0
	ĈF	=	2	2
	ĈF	=	300	300
	ĈE	=	0.5	0.5
	Ĉn	=	9000	9000
	ĈH	=	0	0
	ĈdC	=	50	50
	ĈG	=	315	315
	ĈiA	=	02	02
ĈiS	=	50	50	
Ar	=	1	1	
U2	=	0	0	
P	=	342223	342223	
S	=	351535	351535	
tn	=	BABY + MAJOR + FP600 5	BABY + MAJOR + FP600 5	
		JUMBO 7	JUMBO 7	
tl	=	2	2	
t2	=	5	5	
t3	=	2	2	
L1	=	0	0	
rt	=	BABY 25	BABY 25	
		MAJOR + FP600 160	MAJOR + FP600 160	
		JUMBO 59.7	JUMBO 59.7	
		GIANT 87	GIANT 87	
AE	=	0	0	
BOWL	A	=	3000	3000
	d	=	10	10
SCROLL	Ā	=	20	20
	d	=	5	5
	nu	=	30	30

SUMMARY OF DEFAULT VALUES AND SPECIFIC DECANTER VALUES

RPM - METER 207.16

PASSWORD "207"

C =	0	0								
CF =	2	2								
F =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>					
E =	0.5	0.5								
n =	<table border="1"><tr><td> </td><td> </td><td> </td><td> </td></tr></table>					<table border="1"><tr><td> </td><td> </td><td> </td><td> </td></tr></table>				
H =	0	0								
dC =	50	4								
G =	315	160								
iA =	02	01								
iS =	50	50								

·C =	0	0								
·CF =	2	2								
·F =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>					
·E =	0.5	0.5								
·h =	<table border="1"><tr><td> </td><td> </td><td> </td><td> </td></tr></table>					<table border="1"><tr><td> </td><td> </td><td> </td><td> </td></tr></table>				
·H =	0	0								
·dC =	50	50								
·G =	315	315								
·iA =	02	02								
·iS =	50	50								

Ar =	<table border="1"><tr><td> </td></tr></table>		<table border="1"><tr><td> </td></tr></table>															
U2 =	<table border="1"><tr><td> </td></tr></table>		<table border="1"><tr><td> </td></tr></table>															
P =	<table border="1"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>									<table border="1"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>								
S =	<table border="1"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>									<table border="1"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>								
tn =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>													
tl =	2	2																
t2 =	5	5																
t3 =	2	2																
L1 =	0	0																
rt =	<table border="1"><tr><td> </td></tr></table>		<table border="1"><tr><td> </td></tr></table>															

AE = 0 0

A =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>			
d =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>			

·A =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>			
d =	<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>				<table border="1"><tr><td> </td><td> </td><td> </td></tr></table>			

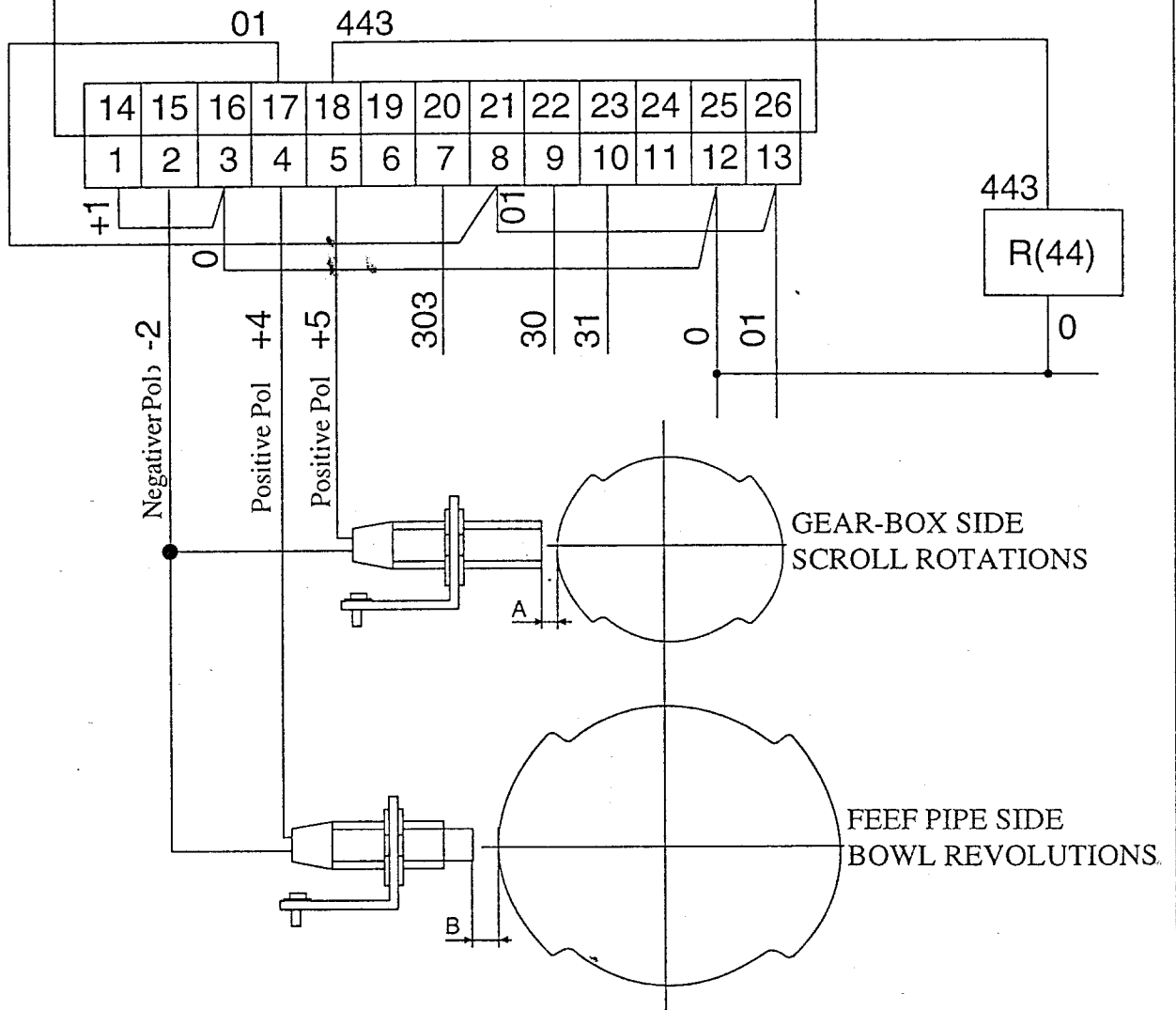
Ab = WITHOUT EXPANSION 0 WITHOUT EXPANSION 0
 WITH EXPANSION 1 WITH EXPANSION 1

QUALIFICA
TION WITH
Ab=1

b =	GIANT 2	1100	GIANT 2	1100
c =	GIANT 2	850	GIANT 2	850

nu = 30 30

CENTRIFUGE RPM-METER 207.16



DISTANCE SENSOR/CAM (METAL PART)

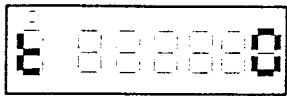
A (totally screened sensor)	0,8 ± 1,5 mm
B (partially screened sensor)	2,5 ± 3,5 mm

COLOURS OF SENSOR CABLES

positive pole (+)	negative pole (-)
brown	blue
brown	black
white	black
white	blue
black	blue

DATA DISPLAY

Data display during normal operation:

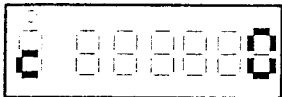


Bowl RPM display (Page 1).

Pressing

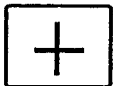


displays:



Scroll differential speed display (Page 2).
(-) indicates negative rotation.

Pressing



displays:



Absolute differential ratio display

$$r = \frac{|\text{Bowl rpm} - \text{Scroll rpm}|}{rt}$$

Pressing



displays:



Display of inputs/outputs status.

The activated input or output is shown by a dash.



Pressing






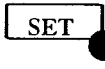
displays (Page 1).

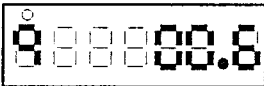
HOURS - COUNTER DISPLAY

To display the hours - counter:


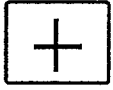

Press at the same time  +  for 2 ÷ 3 seconds


This display  asks for the password to be input


Input with the numeric keys  and confirm with  ; the  led lights up and the following is displayed:


 The hours - counter is displayed. The number increases if input **I4 = ON**




N.B. The value after the comma displays tenths of hours

Pressing  or the keys  or  hours counter display is interrupted

Pressing  puts the hours - counter to zero

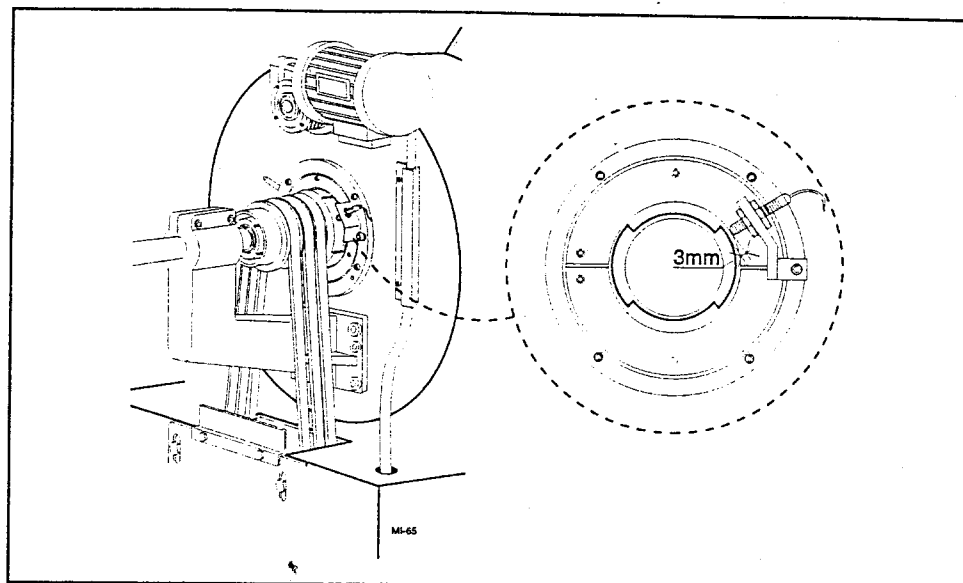
 Clearing is displayed

Confirm with 

Simply pressing  or the keys  or  exits hours - counter display

without putting it to zero.


HOW TO SET CLOCK 1 (BOWL) TACHIMETER



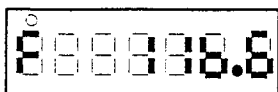
For an easier installation of the rpm-system and to find the correct sensor distance, it is possible to display the frequency (Hz), the total sensor impulse counting and the proportion between the nearest and the farrest metal part calculated by the dC (duty cycle) according to the following procedure, after having placed the sensor at about 3 mm and after having started up the decanter (as shown on the above figure).

Press at the same time the keys  +  for about 2 + 3 seconds.

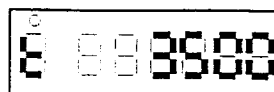


On the display appears  asking for the password.

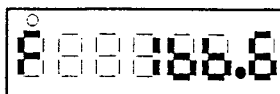
Input **456** and confirm with . The following is displayed.



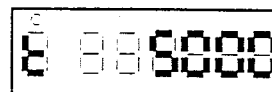
This means that on Page 1 we have



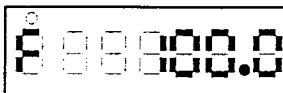
Series
MAJOR/FP 600



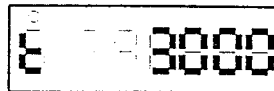
This means that on Page 1 we have



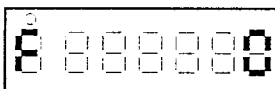
Series
BABY



This means that on Page 1 we have



Series
JUMBO

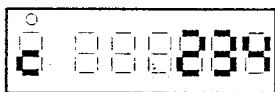


WARNING: this picture is displayed when the centrifuge is at a stand-still, the sensor does not work or is not correctly installed.

Pressing



displays:



The number constantly increases.

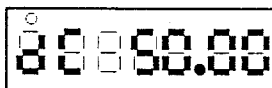
To put counting to zero press



Pressing



displays:



Duty cycle= When the centrifuge is at full operating speed this value must be between 49.00 and 51.00.

If < 49.00, increase the sensor distance;

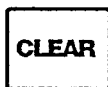
If > 51.00, decrease the sensor distance.

Pressing

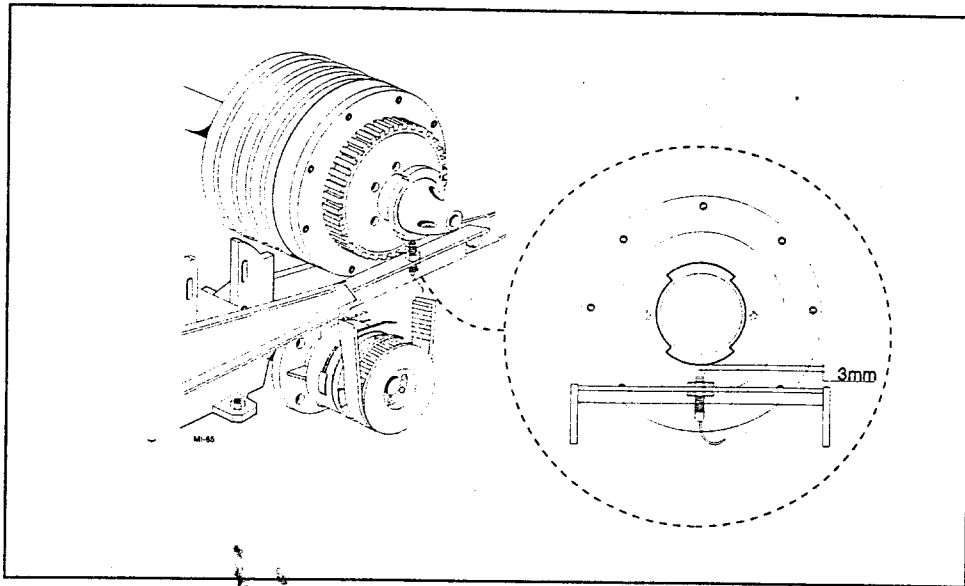


, frequency "F" is displayed again.

Press to exit



HOW TO SET CLOCK 2 (SCROLL) TACHIMETER

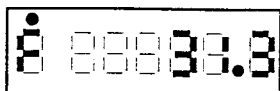


For an easier installation of the rpm-system and to find the correct sensor distance, it is possible to display the frequency (Hz), the total sensor impulse counting and the proportion between the nearest and the farrest metal part calculated by the dC (duty cycle) according to the following procedure after having placed the sensor at about 3 mm and after having started up the decanter: (as shown on the above figure).

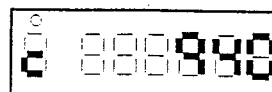
Press at the same time the keys + for about 2 ÷ 3 seconds.

On the display appears asking for the password.

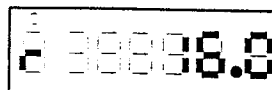
Input and confirm with . The following is displayed.



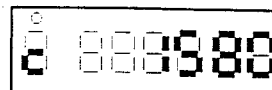
This means that we have Page 2
and Page 3



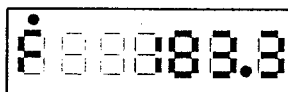
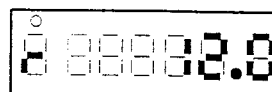
Series
MAJOR
2 FASI



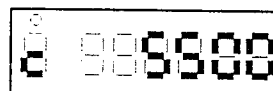
This means that we have Page 2
and Page 3



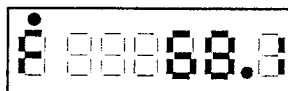
Series
MAJOR
3 FASI/FP 600



This means that we have Page 2
and Page 3



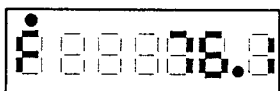
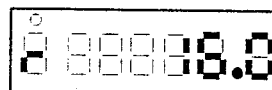
For
BABY 1
BABY 2



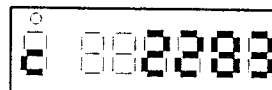
This means that we have Page 2
and Page 3



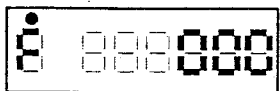
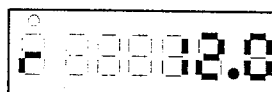
Series
JUMBO
2 FASI



This means that we have Page 2
and Page 3

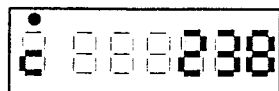


Series
JUMBO
3 FASI



WARNING: this picture is displayed when the centrifuge is at a stand-still,
the sensor does not work properly or is not correctly installed.

Pressing  displays:

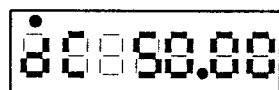


The number constantly increases.


To put counting to zero press



Pressing  displays:




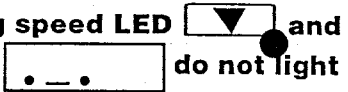
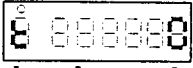
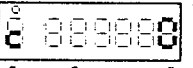
Duty cycle= When the centrifuge is at full operating speed this value must be between 49.000 and 51.00.
If < 49.00, increase the sensor distance;
If > 51.00, decrease the sensor distance.

Pressing , frequency "F" is displayed again.

Press  to exit.

TROUBLESHOOTING

In the following some example of possible problems are given, together with their solutions:

PROBLEM	POSSIBLE - CAUSES AND SOLUTIONS
1) Display does not switch on	Lack of 24 ac V power supply - Make sure that 24 ac V goes to poles <u>12-13</u> . - Erratic power supply - Check the power supply voltage is $\pm 15\%$ of 24VAC.
2) No input signals I1 I2 I3 from the sensor when they are in front of the cams or the whole.	Internal power supply broken - Replace the whole rpm-meter. Inversion of sensor cable poles - Make sure that the negative pole of all sensors go to terminal <u>2</u> and the positive pole to terminal <u>4</u> for the bowl, to <u>5</u> for the scroll and to <u>6</u> for the direction of rotation. Cable interrupted - Replace the cable. Sensor out of order - Replace the sensor. Missing connection between terminals 1 and 3 - Connect the terminals.
3) After having made sure that Inputs I1 I2 and I3 work properly, the rpm-meter does not close output U1 (terminal 9) when the decanter is started up (LED and dash of page 4 do not light up). 	Check input I4 (terminals 7) and make sure it has the same phase as terminal 13. - Connect it according to PIERALISI drawing. Make sure that terminal 3 is connected to the same phase as terminal 12. - Connect according to PIERALISI drawing. Mistakes in parameter SET-UP programming in particular F;n;dC;P;t;n;d. - Correct any wrong data.
4) After having made sure that Inputs I1 I2 I3 and I4 work properly, the rpm-meter does not close output U2 when the decanter is at operating speed LED and dash of page 4 do not light up). 	Mistakes in parameter SET-UP programming particular F;n;dC;U2;S;t;A;d. - Correct any wrong data.
5) The display shows while the decanter runs or displays the bowl speed increasing up to a certain value and then going down to zero. 	Wrong bowl/sensor positioning. - Check frequency F and dC with password 456 . Move the sensor to make sure $49 < dC < 51$.
6) The display shows while the decanter runs or displays the bowl speed increasing up to a certain value and then going down to zero. 	Wrong scroll sensor positioning. - Check frequency F and dC with password 654. Move the sensor to make sure $49 < dC < 51$.

TROUBLESHOOTING

7) Values displayed for t, c, r , are different from those expected.


One of the sensors is not correctly positioned

- Check the position of each single sensor.

Programming mistakes of parameters SET-UP F_n, F_n, U_2, r_t .

- Correct any wrong data.

8) Outputs U_1 with LED  and the dash  and U_2  are activated, but the

 are activated, but the

relevant relays do not react and do not give the relevant enablings.

Phase 01 missing on terminal 8.

- Bring phase 01 to terminal 8.

Phase 01 missing on terminal 8 but not on terminals 9 and/or 10.

- Damages in the internal relays, replace the rpm-meter.

Signals on terminals 9 and 10 but R_{30} and/or R_{31} coils are not excited.

- Check electrical connections and coils.

Coils excited, but no enabling from R_{30} and/or R_{31} .

- Check the use of na and nc contacts on R_{30} / R_{31} according to PIERALISI drawing.

9) The centrifuge is started up with the LED  and the dash 

of page 4 being lit up.

After 5 s (series BABY, MAJOR and FP600) or 7" (series JUMBO) the decanter stops.

The bowl sensor is not correctly placed or does not work properly.

- Check the sensor and its position, if its position, if necessary, replace it.