







EC, PH, ORP, FLOW CONTROLLER



SAFETY RULES

To avoid personal or environmental damages and to guarantee a proper operation of the equipment, the staff in charge of the installation, set up and maintenance of the equipment must follow the instructions of this manual, specially those recommendations and warnings explicitly detailed. In addition, specific instructions for the chemical products to be dosed should be followed.

INDEX

 1 GENERAL DESCRIPTION 1.1 General description 1.2 Description of front part 1.3 Description ofl display 	04 05 05
2CARRIAGE AND MAINTENANCE	06
3 TECHNICAL FEATURES	06
 4FUNCTIONEMENT 4.1 Special configuration menu 4.2 Gauging Gauging the conductivity probe Gauging of the PH / ORP (RX) probe Gauging of flowmeter and the injection flow 4.3 Setpoints 	07 09 09 10 11
- EC setpoint / regulation - PH / ORP (RX) setpoint / regulation - Porportionality value / regulation	12 13 14
 4.4 Alarms Conductivity alarms PH / ORP (RX) alarms Flow alarms 4.5 Choosing automatic or hand regulation 4.6 Hand regulation 4.7 Selection of visualition of the outgoing signal 	15 16 17 18 18 19
5 INSTALLATION	20
6 START UP	24
7 MAINTENANCE	29

1.-GENERAL DESCRIPTION



COMPACT V allows to control the injection of the heads of a dosing pump through a frequency variator.

Injection control through PROPORTIONALITY

Control of the injection of a dosing pump through a frequency variator, in order to keep a previously established PROPORTION between the water flow and the dosing flow.

Constant visualization of the instant flow (M3/H, GPM) of the network, PH / ORP (RX) and CONDUCTIVITY (mS).

FLOW, CONDUCTIVITY and PH alarms.

Injection control through CONDUCTIVITY

Control of the injection of a dosing pump through a frequency variator, in order to fit a predetermined CONDUCTIVITY.

Constant visualization of the instant flow (M3/H, GPM) of the network, PH and CONDUCTIVITY (mS).

FLOW, CONDUCTIVITY and PH alarms.

4.-DESCRIPTION OF FRONT PART



5.-DESCRIPTION OF DISPLAY



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2.- CARRIAGE AND MAINTENANCE



The original packing is prepared so that carriage and storing of the product do not cause any damage to the product, as long as this is done far from heat sources and in dry, ventilated spaces.

Inside packing we include: Compact V Handbook

3.- TECHNICAL FEATURES



Power supply: 230 V AC (+/- 20%) Max consumption: 6 mA Working temperature: 0 - 45 °C Protection: IP 65 Don't leave outdoors unprotected and keep away from the sun

DIMENSIONS



4.- FUNCTIONEMENT



4.1 SPECIAL CONFIGURATION MENU

To reach this menu you must push both keys ESC and ENT for three seconds.

To run forward you will use the arrows (forward without validation) and ENTER (forward with validation). To modify values you will use keys +/-.

T SERVO = 15

Only for the COMPACT S.

T EXT = 15 (see start up)

This value shows the time (seconds) which goes between two consecutive orders from the COMPACT V to regulate the exterior output (4.20 mA). The time will depend on two factors: distance between injection and reading sensor, and water speed (flow and pipe diameter).

Too low a T EXT value will cause fluctuations in the motor speed and therefore in the reading.

For example: if a unit of injected fluid takes 10 seconds to go from the injection pump to the place where the sensor is, the time between two consecutive orders will be longer than 10 sec. Approximately, therefore the value to be introduced will be T *EXT*= 15.

EC: 1.40 mS

Value of the conductivity buffer supplied by **ITC**. If another buffer is to be used, the value of the new buffer will have to be introduced.

Q UNIT: LITERS

Visualization of flow in I/hr (m3/hr) or in gallons/minute (GPM).

DIAM UNIT: MM

Visualization of diameter in mm or in inches.

FLOW K: 34.7

Amount of pulses per m/sec given by the flowmeter.

EXT: 4-20 mA

Selection of outside outlet, 4-20 mA or 0-10V.

TQ = 0: 5s

Minimum time to activate the Q=0 alarm (zero flow), in case it is activated.

+Q: 20%

Increase of nominal flow of injection pump when it is working at a frequency Above 50 Hz.

The maximum working frequency is determined by the frequency variator (UL and F204 parameters) and limited according to the capacity of the injection heads:

If the injection heads are 200 l/hr or less, the maximum working frequency will be 80 Hz, which corresponds to an injection flow increase of 60% (+Q = 60%)

If any injection head is 300 l/hr or more, the maximum working frequency will be 60 Hz, which corresponds to an increase of the injection flow of 20% (+Q = 20%)

NOMINAL FLOW 50 Hz	+Q = 20% 60 Hz	+Q = 60% 80 Hz	
50 100 200	60 120 240	80 160 320	
500	600		

N SECTOR: 0

Number of SECTOR equipments connected in the net with the CONTROLLER 2000.

4.2 GAUGING GAUGING THE CONDUCTIVITY PROBE





Unplug the conductivity probe and wait for reading (N.NN) to become stabilized.

PUSH	WILL APPEAR	EC 0.00	N.NN 1.40	<mark>1.40</mark> Flashing
------	-------------	------------	--------------	-------------------------------

Put the conductivity probe in the buffer liquid 1.40 mS and wait for the reading (N.NN) to be stabilized.

PUSH	ENT	WILL APPEAR	EC N Q	I.NN N.N	P A	H N.N NN%	PROBES ARE GAUGED

GAUGING OF THE PH / RX PROBE



PUSH		WILL APPEAR	EC N.NN Q N.N	PH N.N A NN%	PH N.N Flashing
PUSH	ENT	WILL APPEAR	PH ALM	<mark>N.NN</mark> CAL	<mark>N.NN</mark> Flashing
PUSH		WILL APPEAR	PH ALM	N.NN CAL	<mark>CAL</mark> Flashing
Pasos an <mark>SONDA I</mark>	alogos <u>PH:</u>	a la sonda de RX	RX 0	N.NN 470	
PUSH	ENT	WILL APPEAR	PH 7.0	N.N 4.0	<mark>7.0</mark> Flashing

Put the pH probe in the buffer liquid pH7, wait for the (N.NN) to be stabilized (1 min. Aprox.)

PUSH

	DL	NI NI
WILL APPEAR	Pn	N.N
	7.0	4.0

4.0 Flashing

ENT

Put the pH probe in the buffer liquid pH4, wait for the (*N.NN*) to be stabilized (1 min. Aprox.)



<u>SUNDA URP(RX):</u>

In order to gauge "0" point it is necessary to short-circuit the two poles of the female conector BNC and then press

In order to gauge the ponit "470mV" it is necessary to put the probe in the buffer of 470mV and wait for the reading (N.NN) to be stabilized (1 min. aprox.) and press \mathbf{E}



PUSH		WILL APPEAR	EC N.NN Q N.N	PH N.N A NN%	Q N.N Flashing
PUSH	ENT	WILL APPEAR	Q	N.NN%	N.NN%
			ALM	CAL	Flashing
PUSH		WILL APPEAR	Q ALM	N.NN% CAL	<mark>CAL</mark> Flashing
D I O I					1
PUSH	ENT	WILL APPEAR	Q K 34.7	NNN L/H Di NN mm	NNN Flashing
PUSH	+	To set the sum keeping in mine	of the flows o d their regulat	of the different tion, and exclu	injection modules, uding the acid one.
PUSH		WILL APPEAR	Q K 34.7	NNN L/H Di <mark>NN</mark> mm	<mark>NN</mark> Flashing
PUSH	+	To set the inne flowmeter is loo	r diameter in cated.	mm of the pip	e one which the
PUSH	ENT	WILL APPEAR	EC N.NN Q N.N	PH N.N A NN%	THE FLOWMETER IS GAUGED

4.3 SET POINTS AND REGULATION



CONDUCTIVITY SET POINT AND REGULATION



12



PUSH		WILL APPEAR	EC N.NN Q N.N	PH N.N A NN%	PH. N.N Flashing
PUSH	ENT	WILL APPEAR	PH ALM	N.N CAL	N.NN Flashing
PUSH	+	TO INCREASE O OF PH / RX.	R DECREASE	THE SET-	POINT VALUE
PUSH	ENT	TO FIX THE NEW SET-POINT, WILL APPEAR	PH ALM	N.N CAL	 Flashing
PUSH	+	TO CHOOSE THE PH / RX: e = External regulation th = no regulation. When we choose for regulating and	E REGULATION ation through a rough a servon a regulation (e, ther parameter.	N TO CON n signal 4/ notor) s,), this v	TROL THE 20 mA (inverter) vill not be available
PUSH	ENT	WILL APPEAR	EC N.NN Q N.N	nph n.n A NN%	With the new set- point value chosen and regulation symbol before PH / RX reading.



PUSH		WILL APPEAR	EC N.NN Q N.N	PH N.N A NN%	Q. N.N Flashing
PUSH	ENT	WILL APPEAR	Q ALM	<mark>N.NN%</mark> CAL	<mark>N.NN%</mark> Flashing
PUSH	+	TO INCREASE OF OF INJECTION	R DECREASE	THE PROPC	RTIONAL VALUE
PUSH	ENT	TO FIX THE NEW INSTRUCTION VALUE, WILL APPEAR	Q ALM	N.NN% CAL	 Flashing
PUSH	+	TO CHOOSE THE e =External regulation (s = Regulation thr = no regulation	REGULATIOI tion through an ough a servor	N TO CONTR n signal 4/20 r notor)	OL THE PH:: nA (inverter)
		When we choose a regulating another	a regulation (e parameter.	,s,), this will	not be available for

PUSH	ENT	WILL APPEAR	EC N.NN nQ N.N		PH N.N A NN%		

With the new set-point value and regulation symbol before the PH reading.

4.4 ALARMS CONDUCTIVITY ALARMS



	_				
PUSH	► WI	LL APPEAR	EC N.NN Q N.N	PH N.N A NN%	EC N.NN Flashing
PUSH	ENT WI	LL APPEAR	EC ALM	N.NN CAL	<mark>N.NN</mark> Flashing
PUSH	► WI	LL APPEAR	EC ALM	N.NN CAL	<mark>ALM</mark> Flashing
PUSH	ENT W	ILL APPEAR	EC > 0.0 < 0.0	T T	<mark>0.0</mark> Flashing
PUSH	+ -	increase or o	decrease the m	aximum allo	wed differentia.
PUSH	V	LL APPEAR	EC > 0.0 < 0.0	T T	 Flashing
PUSH	+ To - (T	o increase or o	decrease the all).	lowed time v	vith the differentia
PUSH	► w	ILL APPEAR	EC > 0.0 < 0.0	T T	<mark>0.0</mark> Flashing
PUSH	+ то	increase or o	decrease the m	inimum allov	ved differential.
PUSH		LL APPEAR	EC > 0.0 < 0.0	T T	 Flashing
PUSH	+ To	o increase or o	decrease the al).	lowed time v	vith the differentia
PUSH	ENT	To validate	and go back to	original scre	een
PUSH	ESC ESC	To go back	to main screen	without vali	dation.

PH / RX ALARMS



PUSH		WILL APPEAR	EC N Q	I.NN N.N	PH N.N A NN%	PH N.N Flashing
PUSH	ENT	WILL APPEAR	PH ALM		N.N CAL	<mark>N.N</mark> Flashing
PUSH		WILL APPEAR	PH ALM		N.NN CAL	<mark>ALM</mark> Flashing
PUSH	ENT	WILL APPEAR	PH	> <mark>0.0</mark> < 0.0	T T	<mark>0.0</mark> Flashing
PUSH	+	To increase or o	decrea	se maxin	num allowed	d differential.
PUSH		WILL APPEAR	PH	> 0.0 < 0.0	T T	 Flashing
PUSH	+	To increase or ((T : no alarm)	decrea).	se the tir	me allowed v	with the differential
PUSH		WILL APPEAR	PH	> 0.0 < <mark>0.0</mark>	T T	<mark>0.0</mark> Flashing
PUSH	+	To increase or o	decrea	se minim	num allowed	differential.
PUSH		WILL APPEAR	PH	> 0.0 < 0.0	T T	 Flashing
PUSH	+	To increase or ((T : no alarm)	decrea).	se the tir	me allowed v	with the differential
PUSH	ENT	ENT To validate	and g	o back to	initial scree	n.
PUSH	ESC	ESC To go back	to ma	in screen	without val	dating.

FLOW ALARMS



					Color Color	
PUSH		WILL APPEAR	EC N.NN Q N.N	PH N.N A NN%	PH N.N Flashing	
PUSH	ENT	WILL APPEAR	Q ALM	N.NN% CAL	N.NN % Flashing	
PUSH		WILL APPEAR	Q ALM	N.NN CAL	ALM Flashing	
PUSH	ENT	WILL APPEAR	Q Q = 0 OUT RANGE	OFF OFF	<mark>OFF</mark> Flashing	
PUSH	+	To choose OFF/ON and so activating (ON) or deactivating (OFF) the zero flow alarm.				
PUSH		WILL APPEAR	Q Q = 0 OUT RANGE	OFF <mark>OFF</mark>	OFF Flashing	
PUSH	+	To choose OFF/ proporcionality s injection pump.	ON. It will active the point corres	vate the alarr pond to injec	n in case of the ction flow, out of range of	
PUSH	ENT	WILL APPEAR	Q ALM	N.NN% CAL	Should it be:: OUT RANGE: OFF	
		WILL APPEAR	Q MAX Q MIN	<mark>T 30</mark> T 30	Should it be:: OUT RANGE: ON	
PUSH	+	To modify the time needed to activate the alarm of maximum flow.				
PUSH		WILL APPEAR	Q MAX Q MIN	T 30 T <mark>30</mark>	T 30 Flashing	
PUSH	+	To modify the ti	me needed to	activate the a	alarm	
PUSH	ENT	WILL APPEAR	Q ALM	N.NN% CAL	Should it be OUT RANGE: ON	
PUSH	ESC	To go back to th	ne initial screer	٦.		

4.5 CHOOSING AUTOMATIC (A) OR MANUAL (M) REGULATION





4.6 MANUAL REGULATION (M)

With the regulation in the M position (manual) it will be possible to change the regulation (servomotor %, 4-20 mA of the variator) directly with the +/- keys, and therefore to change the injection flow.

To change the servomotor regulation (%), it will be necessary to previously visualize this sort of regulation (NN%).

To change the regulation 4-20 mA of the variator, it will be necessary to previously visualize this sort of regulation (N.N m).



4.7 SELECTION OF VISUALIZATION OF THE OUTGOING SIGNAL



4 - 20 mA: INVERTER SIGNAL (% : only COMPACT S)



According to the selection of visualization of output signal

5.- INSTALLATION



To install this pump it is advisable to choose places protected from water, away from heat sources and with air renewal.



FLOWMETER

1

2)

Instant flowmeter. To set it up follow the instructions contained in the relevant Handbook.

CONNECTOR CLAMP FOR

Connector clamp with flowmeter adapter.







5

6

FLOWMETER 1" 1/4

PH / RX ELECTRODE

To set it up follow instructions contained in the relevant Handbook.

PH / RX ELECTRODE HOLDER

5 CONDUCTIVITY ELECTRODE

To set it up follow instructions contained in the relevant Handbook.

CONNECTOR CLAMP 3/4 "

Connector clamp ³/₄, for PH / RX and conductivity electrode.

6





MULTIFERTIC

To set it up follow the instructions contained in the relevant Handbook, keeping in mind that the frequency variator will work as a motor protection.

FORCED VENTILATION

Additional ventilation needed for the operation with the frequency variator. To fit it up, please read chapter on WIRING

FREQUENCY VARIATOR - INVERTER

Frequency variator. To set it up please follow the instructions contained in the relevant Handbook and read chapter on CONNECTIONS.



10) COMPACT V

9



WIRING DIAGRAM





The probe cables must go in a separate piping.

A molded case circuit breaker device must be installed according EN-60204-1.

A disconnected dispositive must be installed in case of emergeny.

The equipment must be protected to avoid untimetily sudden starts.



INJECTION CONTROL THROUGH PROPORCIONALITY



The maximum water flow together with the maximum flow of the dosing Pump (see table of the flow increases through to work to 60 Hz, on page 10), will determine the maximum proportion to be used in every installation:

Max. %= max.Injection flow (I/hr)/ max. Water flow (I/hr)

Ex.:Water flow = 40.000 l/h
Nominal pump flow (a 50 Hz):
MF2- 300/3 - 300 - 50
Keeping in mind that the 50 l/hr model is for acid, and that the
300 l/hr model is regualted at 50%
Nominal pump flow = 300 + 300 x 50/100 = 450 l/hExpected proportion = 1%
The injection flow will be:
 $40.000 \times 1 / 100 = 400 l/h$ Maximum proportion (%máx.) = 540 / 40.000 x 100 =
= 1.35 %(Dosing pump:
Nominal flow -50 Hz- = 450 l/h
Nominal flow -60 Hz- = 540 l/h)

COMPACT V IN



FIX ALL THE COMPONENTS (chapter 5 pag 20), leaving out of the pipe the conductivity and PH / RX detector.

- PREPARE THE SOLUTION TO INJECT WITH THE RIGHT CONCENTRATION
- GAUGE THE CONDUCTIVITY ELCTRODE (chapter 7) and place it in the pipe. To gauge with another buffer see Special Configuration Menu (chapter 4.1 pag 7).
- GAUGE PH / RX ELECTRODE (chapter 4.2 pag 10) and place it in the pipe.
- GAUGE FLOWMETER AND INTRODUCE INJECTION FLOW. To change the units see the Special Configuration Menu (chapter 4.1 pag 7).
- INTRODUCE PROPORTIONALITY ORDER AND SELECT e: EXTERNAL OUTPUT SIGNAL TO BE REGULATED.
- SELECCION DE LA VISUALIZACION DE LA SEÑAL DE SALIDA EN *mA*: SEÑAL PARA EL VARIADOR (capítulo 4.7 pag 19).

COMPACT V IN



WAIT FOR THE READINGS TO BECOME STABLE. (Si es necesario, modificar la consigna de proporcionalidad para ajustar el valor de la conductividad o el PH / RX según se invecte abono o ácido).

IINTRODUCE THE NECESSARY ALARMS (chapter 4.4).





The regulation of the injection flw is made through a PI control. This sort of control compares the conductivity reading obtained with the set point, and tries to reduce the difference by modifying the motor frequency.

The COMPACT V will wait for a new order to be given that the effects of the previous order have been received by the conductivity detector. This waiting time will depend on how long it takes for the injected liquid to come out of the pump and reach the detector (delay time of the installation).







- FIX ALL THE COMPONENTS (chapter 5 pag 20), leaving out of the pipe the conductivity and PH / RX detector.
- PREPARE THE SOLUTION TO INJECT WITH THE RIGHT CONCENTRATIONS
- GAUGE THE CONDUCTIVITY DETECTOR (chapter 4.2 pag 9) and place it in the pipe. To gauge with another buffer see Special Configuration Menu (capítulo 4.1 pag 7).
- GAUGE PH ELECTRODE (chapter 4.2 pag 10) and place it in the pipe.
- GAUGE FLOWMETER (chapter 4.2 pag 11). To change the units see the Special Configuration Menu (chapter 4.1 pag 11).
- INTRODUCE PROPORTIONALITY ORDER AND SELECT e: EXTERNAL OUTPUT SIGNAL TO BE REGULATED.
- SELECT FOR THE VISUALIZATION OF THE OUTPUT SIGNAL mA: signal for the inverter.
- SELECT AUTOMATIC REGULATION (chapter 4.5 pag 18).
- START THE INSTALLATION (ONLY WATER) AND CHECK THE READINGS.





- THE DOSING PUMP WILL START UP. **OBSERVE THE DELAY TIME OF THE INSTALLATION:** The time which goes between starting the dosing pump and the change in the conductivity reading produced by this injection.
- SWITCH THE COMPACT V IN **OFF** (The injection will stop).
- MODIFY DELAY TIME OF THE INJECTION IN **T EXT** OF THE SPECIAL CONFIGURATION MENU (chapter 4.1 pag 7).
- SWITCH THE COMPACT IN **ON**.
- WAIT FOR THE READINGS TO BECOME STABLE.
- INTRODUCE THE NECESSARY ALARMS (chapter 4.4).

7.- MAINTENANCE



List of parts

CODE	DESCRIPTION	UNIT
33-036	Relay board Con2-v6 assembly	1
33153	Cable ser c + (c 6p) nº 1	1
33154	Cable flow 270mm c+(c3p)	1
33155	Cable RS 485 c ag ela	1
33156	Cable EC 270mm c+(c4p) ela	1
33157	Cable 4.20 c + (c 5p) nº 3	1
33159	Cable 3x0,25x500 rn nº 4-500	3
33162	Cable 6x0,25x250: rmzbvn nº 20	1
33516	Rotative switch	1
33605	Electronic card ServoController	1
33654	Cable pH 270mm C+ (bnc 2p) ela	1
34601	Software Compact it001	1
42350	Transformer toroidal 220-24v 80va	1

EC CONFORMITY DECLARATION

I.T.C S.L.. Vallès, 26 Polígono Industrial Can Bernades-Subirà 08130 Santa Perpètua de Mogoda

Declares that all models COMPACT V products, identified by a serial number and year of manufacture, strictly fulfill low voltages directives 73/23/CE and electromagnetic compatibility directives 89/336/CE, as long as installation, use and maintenance are carried out following the prevailing regulation and following the instructions contained in the handbook.

Antón Planas Manager

WARRANTY

I.T.C. S.L. Warrants the product specified in this document for a period of 1 year from the purchase date. This warranty obligation is limited to the free replacement of the damaged parts due to any material or manufacture defect. This warranty does not include periodic maintenance and damage resulting from misuse.

The equipment must be sent to **I.T.C. S.L**. Service Center with prepaid transport charges, and will be sent back with transport charges for customer's account.

The warranty document with sales date and shop stamp, or an invoice copy must be sent with the equipment.

MODEL

SERIAL #

Sales date and shop stamp	
DATE:	

CE

Original manual



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