



PROGRAMMING OF THE CARD MT151-R2 AND GENERAL OPERATION

Sect.1.1. ELECTRIC AND SYNOPTIC PANEL

The control electric board consists of:

1. General start and stop switch with integrated fuse holder
2. Feeder synoptic panel
3. Alarm red lamp signalling the missing of material

The feeder does not stop immediately when the alarm turns on, but occurs automatically only after a certain number of loading attempts (usually 10 programmed in the electronic control card) are made.

This enables automatic resetting in the case of temporary or accidental lack of material.

To reset the feeder's no-load alarm just switch off then switch on the machine again.

The synoptic panel provides the following signal:



ALARM

If led is lit this means that feeder is not loading the material



Control panel



Sect.1.2. TECHNICAL PROGRAMMING MODE


BE VERY CAREFUL WHEN YOU CARRY OUT MODIFICATIONS IN THE TECHNICAL PROGRAMMING MODE. IN CASE OF WRONG PROGRAMMING, THE FEEDER MAY NOT WORK PROPERLY.


To enter the Technical Programming mode, press and hold for 5 seconds the 4 keys of the panel. The display will show E08 for 2 seconds and then it will resume the standard mode of feeder operation. With this operation, you enable the TECHNICAL PROGRAMMING mode; this means that you can modify any parameter.

To access the programming of the parameters, press and hold more than 3 seconds the key "Prog.".

With the arrows  and  you can display the number of each parameter (P00; P01; P02; P03; P04; etc.).

When you reach the required parameter, press and hold less than 3 seconds the key "Prog.": the set value of the parameter will be displayed. If the key is pressed and held more than 3 seconds, the set value will blink and you will be allowed to modify it with the arrows  and .

After modifying the value, press and hold "Prog." more than 3 seconds to confirm the change. Instead, if you press the key "" the modified value will be aborted and you will revert to the numbers of the parameters to modify.

To exit the programming mode, when you are in the parameter display, press "" and you will revert to the display of the status of the machine; still you will be allowed to enter the modification of all parameters. To exit completely the technical programming mode, turn off the feeder; this way the following time the feeder is turned on, it will enter the user mode and not the technical mode.



Description of keys



1



2

When you turn on the feeder, press and hold - in the initial 5 s of starting - for 5 s the 4 keys of the panel at the same time, until the message "E08" is displayed.

(XX are the loading seconds. These are different in each type of feeder)



3

This page is displayed for a few seconds, then the display reverts to the standard feeder operation page.



AFTER ENTERING THIS CONFIGURATION, IT WILL GO ON UNTIL THE FEEDER IS TURNED OFF.





3 SEC.




On this page, you can enter the programming mode and display the values of all parameters by pressing and holding more than 3 seconds the key "PROG".

You can now see all the parameters (P00; P01; P02; P03 etc.) by pressing  or .

- Press the key "PROG" once to read the set value of the parameter.
- Press the key more than 3 seconds to modify the displayed parameter.

With the arrows  or  you can increase or decrease the value.

To save the new value, press and hold more than 3 seconds the key "Prog."

If you do not want to confirm the change, press the key  and you will revert to the display of the parameters.



THE FOLLOWING PAGE DESCRIBES THE FUNCTIONS OF ALL PARAMETERS THAT CAN BE MODIFIED IN THE TECHNICAL PROGRAMMING MODE

BE VERY CAREFUL WHEN YOU CARRY OUT MODIFICATIONS IN THE TECHNICAL PROGRAMMING MODE. IN CASE OF WRONG PROGRAMMING, THE FEEDER MAY NOT WORK PROPERLY.

THEREFORE, DO NOT MODIFY ANY PARAMETER OTHER THAN THE FOLLOWING ONES

Only technical personnel may modify the following parameters.

MODE	NO. OF PARAM. (standard setting)	DESCRIPTION OF THE PARAMETER	RANGE			
		FUNCTIONS IN THE MACHINE				
THIS IS VISIBLE, IF ENABLED, IN USER MODE TOO	P00 (008)	LOADING TIME	MIN.=	2	Seconds	
			MAX.=	999	Seconds	
		Time the motor is enabled. This may be interrupted by a lacking external consent (if enabled). e.g. capacitive sensor, pressure switch, etc.				
	P01 (005)	TIME OF DUCT CLEANING OF TUBE A	MIN.=	0	Seconds	
			MAX.=	60	Seconds	
		When the option "Duct cleaning (P09)" is enabled, the output "Duct cleaning of tube A" is turned on. This parameter sets the time the feeder, after loading the material, goes on loading air without material to clean the suction duct after the loading cycle. ATTENTION: the time of duct cleaning is subtracted from the total loading time. EXAMPLE: if you set the loading time P0 to 10 seconds and the time of duct cleaning P1 to 6 seconds, the feeder will load the material for 4 seconds and clean the duct for 6 seconds.				
	P02 (005)	TIME OF DUCT CLEANING OF TUBE B	MIN.=	0	Seconds	
			MAX.=	60	Seconds	
		When the option "Duct cleaning (P09)" together with option "Proportional valve (P08)" is enabled, the output "Duct cleaning of tube B" is automatically turned on. This parameter sets the time the feeder, after loading the material, goes on loading air without material to clean the suction duct after the loading cycle. ATTENTION: the time of duct cleaning is subtracted from the total loading time. 1)EXAMPLE: if you set the loading time P0 to 20 seconds and the time of duct cleaning P1 to 3 seconds and P2 to 2 seconds, with a mixture of the proportional valve of 50% and with a layer time of 10 seconds, the feeder will load the material for 2 seconds on TUBE A and duct clean the TUBE A for 3 seconds then the tube will be switched and will do: 3 seconds of loading on TUBE B and 2 seconds of duct cleaning of TUBE B, then the tube will be switched and the same cycle will be repeated up to 20 seconds of total loading time.				
	P03 (050)	1)PERCENTAGE OF MATERIAL MIXTURE	MIN.=	0	%	
		MAX.=	100	%		
	When the option "Proportional valve" is enabled, the parameter "Percentage of material mixture" is automatically enabled. This parameter sets the percentage, within a complete switch of the proportional valve, that the TUBE A continues loading. Since the total percentage must be always 100%, the mixing percentage of the material B is automatically the difference between 100% and the setting of "Percentage of material mixture".					



THIS IS VISIBLE, IF ENABLED, IN USER MODE TOO	P04 (003)	¹⁾MINIMUM LAYER TIME	MIN.= 1 Seconds MAX.= 60 Seconds
		The minimum layer time is the time the lowest percentage of mixture setting never decreases.	
	P05 (005)	WORKING TIME OF TIMED OPERATION	MIN.= 1 min. MAX.= 60 min.
THIS IS VISIBLE <u>ONLY</u> IN TECHNICAL MODE			
	P06 (025)	PAUSE TIME OF TIMED OPERATION	MIN.= 1 min. MAX.= 60 min.
		When the "timing" operation is enabled, the pause time can be set. In the display this is shown by the letter "o" followed by the seconds missing to the end of the pause. If the pause exceeds 99 seconds, the display will show the minutes before reloading and when 99 seconds are reached the display will change and scan the missing seconds.	
	P07 (1)	ENABLING OF FILTER PULSE CLEANING	MIN.= 0 DISABLED MAX.= 1 ENABLED
		Enabling of filter pulse cleaning. When this parameter is enabled, the filter cleaning valve is cyclically energized for an ON time "Filter pulse cleaning ON (P18)" and deenergized for an OFF time "Filter pulse cleaning OFF (P19)", within the "Filter cleaning time". N.B.: In order to get a complete cycle "Filter pulse cleaning ON" + "Filter pulse cleaning OFF" must not exceed the "Filter cleaning time".	
	P08 (1)	ENABLING OF PROPORTIONAL VALVE (ENABLING OF TERMINALS 12 AND 13 OF THE CARD)	MIN.= 0 DISABLED MAX.= 1 ENABLED
		Enabling of the loading of material with the proportional valve. With this enabling, the parameters related to the proportional valve (P03; P04) are automatically enabled in the user mode.	
	P09 (0)	ENABLING OF DUCT CLEANING (ENABLING OF TERMINALS 16 AND 17 OF THE CARD)	MIN.= 0 DISABLED MAX.= 1 ENABLED
		Enabling of the duct cleaning option. With this enabling, the parameters related to the duct cleaning P01+P02= are automatically enabled in the user mode, regardless of the enabling of the parameter of the proportional valve (P08). In case of standard feeder, the parameter P02 can be changed but is not taken into account. If a proportional valve is installed and enabled, P02 will be taken into account.	
	P10 (0)	ENABLING OF TIMING	MIN.= 0 DISABLED MAX.= 1 ENABLED
		Enabling of the timing option. With this enabling, the parameters related to timing (P05; P06) are automatically enabled in the user mode.	
	P11 (0)	ENABLING OF THE AUXILIARY INPUT (ENABLING OF TERMINALS 10 AND 11 OF THE CARD)	MIN.= 0 DISABLED MAX.= 1 ENABLED
		Enabling of the auxiliary input option (see wiring diagram). This function can be connected to an external consent; when the status of the contact changes, the feeder may change its function, turn on or turn off according to the setting.	
	P12 (0)	LOGIC VALUE OF SPADE INPUT	MIN.= 0 DIRECT MAX.= 1 INVERTED
		This changes the status of spade input. EXAMPLE: if the input value is 0 and the contact is N.O. this is considered as N.O.; if the logic value is 1, the status is changed and instead of N.O. is considered as N.C.	



THIS IS VISIBLE <u>ONLY</u> IN TECHNICAL MODE	P13 (0)	LOGIC VALUE OF AUXILIARY INPUT	MIN.= 0 DIRECT MAX.= 1 INVERTED
		This changes the status of auxiliary input. EXAMPLE: if the input value is 0 and the contact is N.O. this is considered as N.O.; if the logic value is 1, the status is changed and instead of N.O. is considered as N.C.	
	P14 (0)	MASTER ENABLING	MIN.= 0 DISABLED MAX.= 1 ENABLED
		It sets the device as Master (NOT AVAILABLE IN THIS VERSION)	
	P15 (0)	ENABLING OF SERIAL COMMUNICATION (ENABLING OF TERMINALS CN5A1 AND CN5B1 OF THE CARD)	MIN.= 0 DISABLED MAX.= 1 ENABLED
		This enables the serial communication of the device connected with a flat cable to a general control card. (THIS PARAMETER IS USED IN CENTRAL ASPIRATION PLANTS)	
	P16 (000)	OPERATING MODE OF THE AUXILIARY INPUT	MIN.= 0 EXT. CONSENT MAX.= 1 LEVEL SENSOR
		This parameter changes the operating mode of the feeder. EXAMPLE: this parameter is used to couple the feeder to a device that acts: when the hopper being loaded is full: MODE 0 (capacitive sensor or spade sensors installed in the hopper) or when the container is full: MODE 1 (capacitive sensor or pressure switch, installed in the container of the feeder). In the mode 0, the feeder refers to the loading seconds previously set on the display and interrupts its standard loading cycle when the status of the external contact changes and resumes it only after the reset of the auxiliary contact. In the operating mode 1, the feeder refers to the loading seconds but when the device installed on the container acts, it stops loading the material and unloads it and, after unloading, starts automatically a new loading.	
	P17 (005)	FILTER CLEANING TIME	MIN.= 2 Seconds MAX.= 30 Seconds
		Time the solenoid valve is energized: by pulses if the parameter P07 is enabled or continuous if the parameter P07 is disabled. In the display this is shown by the letter "F" followed by the seconds missing to the end of the filter cleaning.	
	P18 (005)	FILTER CLEANING TIME PULSE ON	MIN.= 1 Tenths of s MAX.= 50 Tenths of s
		Time the solenoid valve is energized in the option "Filter pulse cleaning (P07)"	
	P19 (015)	FILTER CLEANING TIME PULSE OFF	MIN.= 1 Tenths of s MAX.= 50 Tenths of s
		Time the solenoid valve is not energized in the option "Filter pulse cleaning (P07)"	
	P20 (010)	LOADING WAIT TIME	MIN.= 1 Seconds MAX.= 240 Seconds
		In case of failed loading, this is the time of wait before another loading, within the "Number of loading trials (P21)". In the display this is shown by the letter "A" followed by the seconds missing to the start of loading. If the pause exceeds 99 seconds, the display will show the minutes before reloading and when 99 seconds are reached the display will change and scan the missing seconds.	
	P21 (005)	NUMBER OF LOADING TRIALS	MIN.= 0 Infinite MAX.= 10 Trials
		In case of failed loading, this is the number of loading trials before the feeder stops finally. To reset the lock, turn off and turn on.	

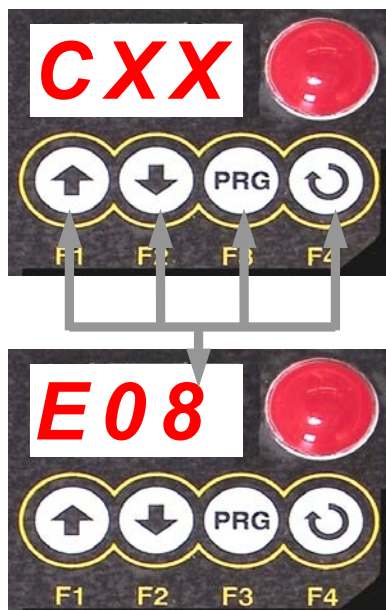


THIS IS VISIBLE <u>ONLY</u> IN TECHNICAL MODE	P22 (008)	WAITING TIME AT THE END OF LOADING BEFORE SPADE OPENING	MIN.= 0 Seconds MAX.= 30 Seconds
		This time is the wait for spade opening after the last loading. In the display this is shown by the letter "P" followed by the seconds missing to the opening of the spade.	
	P23 (010)	¹⁾FILLING TIME OF TUBE A	MIN.= 1 Tenth of s MAX.= 200 Tenth of s
		This time is enabled only if the proportional valve parameter is enabled too. This time (that is not shown on the display) is added to the loading time of the tube A.	
	P24 (010)	¹⁾FILLING TIME OF TUBE B	MIN.= 1 Tenth of s MAX.= 200 Tenth of s.
		This time is enabled only if the proportional valve parameter is enabled too. This time (that is not shown on the display) is added to the loading time of the tube B.	
	P25 (000)	PAUSE BETWEEN LOADING CYCLES	MIN.= 0 Seconds MAX.= 999 Seconds
		Wait time between two loading cycles.	
	P26 (005)	DEVICE ADDRESS	MIN.= 0 MAX.= 32
		This parameter is enabled only if the serial communication parameter (P15) is enabled too. This is required to set the number of the device in a central aspiration plant: in the range 1-32. If this parameter is set to 0 with the serial communication parameter (P15) enabled, the device is disabled.	

RESET TO FACTORY SETTINGS

If you want to cancel all programmed settings and reset the card to factory settings, carry out the following procedure:

ATTENTION: this procedure brings back the feeder to the **STANDARD** condition, that is only loading of material without any added proportional valve, duct cleaning or anything else. Therefore be very cautious when using this procedure.



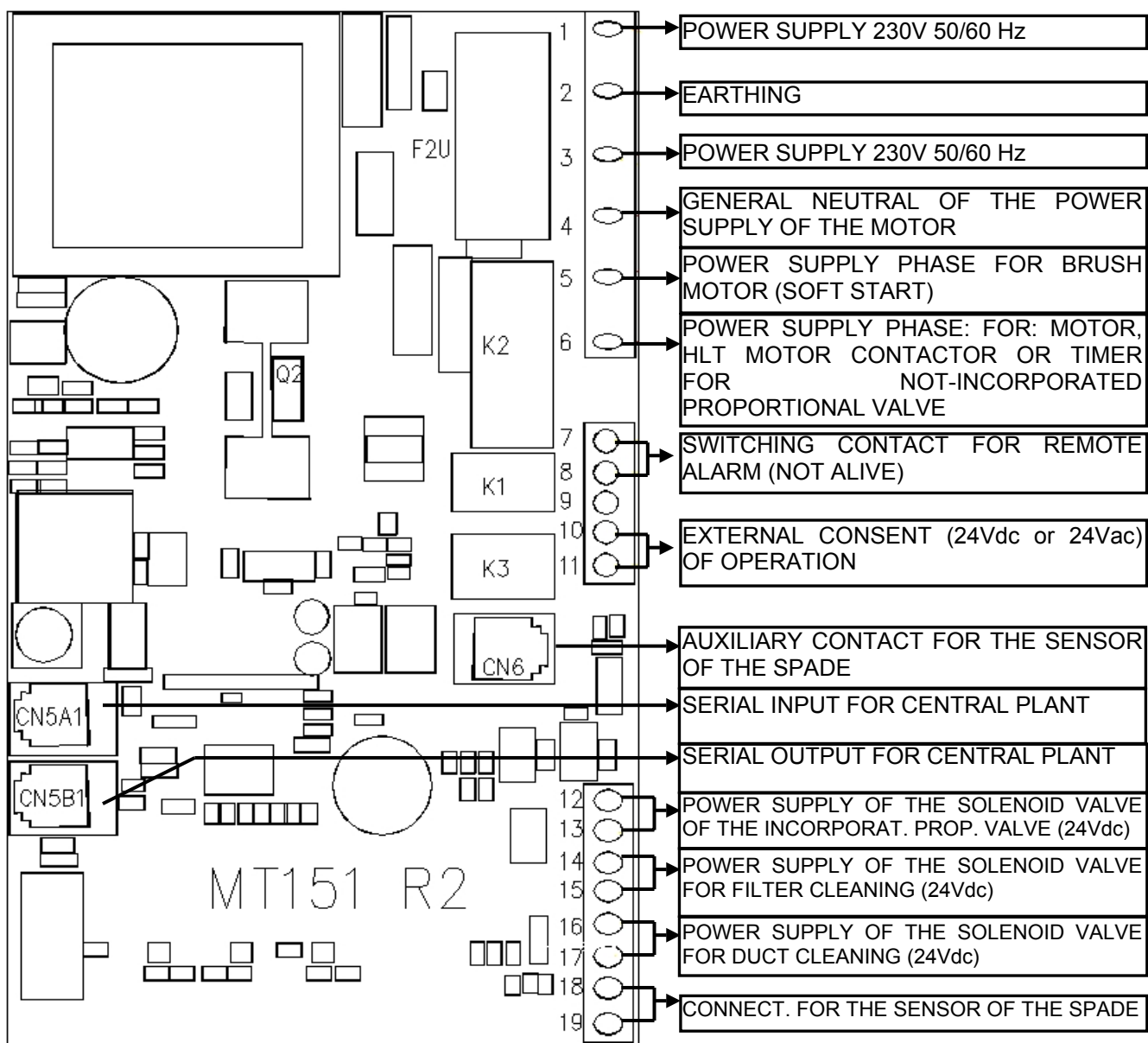
1. After turning on the feeder, press and hold - in the initial 5 s of starting - the 4 keys of the panel at the same time, until the message "E08" is displayed.
2. enter the following sequence by pressing a key at a time one after the other.



Sect.1.3. DESCRIPTION OF THE CARD

The following figure shows the BACK of the feeder control card. The functions of the terminals are described on its side.

To enable the terminals of the figure, see on the following pages the general table with the description of all the parameters.





1) LOGIC OF THE OPERATION WITH PROPORTIONAL VALVE; CLEANING OF THE DUCT AND FILLING OF THE TUBE

The operation of the proportional valve is different from the standard and previous operations thanks to a built-in logic designed especially to get the best production performance with a simple but "fine" adjustment.

The feeder, unlike past models, has no potentiometer, on the display you can get an accurate adjustment from 0% to 100% **with a deviation of 1%** (see parameter P03).

The feeder with the new logic will never load halfway through since it calculates automatically the exact times according to the percentage and the layer set.

Within these times, a time additional to the loading time can be taken into account for filling of the tubes, split between TUBE A and TUBE B (see parameters P23 and P24).

Moreover, you can insert an additional time for cleaning of the discharge duct (if the duct cleaning is installed) to set a time for emptying of the discharge duct, split between TUBE A and TUBE B (see parameters P01 and P02).

The logic of the operation of the set of operations described above is reported in the example below.

With the parameters PROPORTIONAL VALVE (P08) and DUCT CLEANING (P09) enabled:

ATTENTION: the duct cleaning time prevails on the loading time and is always subtracted from the loading time of the tube in which it is set. Therefore, if you set a duct cleaning time exceeding the loading time, the feeder will only carry out the duct cleaning and will never load the material.

DESCRIPTION	ABBREVIATION	SETTINGS 1ST EXAMPLE	SETTINGS 2ND EXAMPLE
Loading time	P00	20	24
Duct cleaning time A	P01	3	1
Duct cleaning time B	P02	2	3
% of mixture	P03	50	10
Minimum layer time	P04	5	2
Filling time of tube A	P23	10	20
Filling time of tube B	P24	10	20

THE LOGIC OF THE PROPORTIONAL VALVE DOES NOT INCLUDE HALF LOADING CYCLES, THEREFORE IT WILL ALWAYS CALCULATE EXACT TIMES IN ACCORDANCE WITH THE PARAMETERS SET.

1ST EXAMPLE

In the first example, the set times are exact to carry out a total loading cycle without residual time:

in this case, the feeder starts loading and the count-down of the seconds to the end of the cycle is delayed for a time equal to the TUBE FILLING TIME, in this case 10 tenths of second = 1 second. After this time, the feeder will start the count-down until 3 seconds before the exchange of the tubes. This time is the DUCT CLEANING TIME FOR TUBE A that is subtracted from the loading time each loading of the tube.

Since the layer time is 5 seconds and the percentage 50%, the feeder will carry out two complete cycles; the motor - though - will not be ON only in the 20 seconds of the loading, since 10 tenths of seconds must be added for filling of the tube each new loading. Therefore if the tube A carries out 2 loading operations and the tube B two ones more, one second must be added each loading operations, therefore the total loading will have 4 seconds more and therefore the motor will be ON for 24 seconds.

After 5 seconds of loading of tube A, the feeder will exchange the tubes and start loading the tube B; the count-down of the seconds will start after 1 second of TUBE FILLING TIME, in this case 10 tenths of second = 1 second. As with tube A, the feeder will now start the count-down until 2 seconds before the exchange of the tubes (DUCT CLEANING FOR TUBE B).

The feeder will then carry out another cycle, until the set loading seconds are over.



2ND EXAMPLE

In this example, in the contrary of the other, the set times are not exact and we compare the behaviors of a STANDARD FEEDER AND OF A FEEDER OF THE SERIES HL.

STANDARD FEEDER

In a standard feeder the loading time would be carried out 1½ times since it will do:

MIN. LAYER 2 S=	2 seconds of filling of tube A (not included in the total loading time) 1 second of loading from tube A including 1 second of duct cleaning then it carries out the exchange since percentage is set to 10%
90% OF LOADING OF TUBE B	2 seconds of filling of tube B (not included in the total loading time) 15 seconds of loading from tube A including 3 second of duct cleaning then it carries out another exchange.
MIN. LAYER 2 S=	2 seconds of filling of tube A (not included in the total loading time) 1 second of loading from tube A including 1 second of duct cleaning then it carries out the exchange since the percentage is set to 10%
90% OF LOADING OF TUBE B	2 seconds of filling of tube B (not included in the total loading time) 1 second of loading from tube A, since when this is added to the 3 seconds of duct cleaning the total 24 seconds of loading are reached.

M.S.M. FEEDER

In the feeder of the series HL, in case times and percentage set do not complete a loading cycle, an exact loading cycle will be calculated that keeps the percentage.

In this case, if the loading time is set to 24 and the minimum layer time to 2 s, this means that the lowest percentages, in this case the percentage of the tube A=10%, must never be smaller for 2 seconds. Therefore, the feeder will not carry out 1½ cycles but only 1 as follows:

MIN. LAYER 2 S=	2 seconds of filling of tube A (not included in the total loading time) 2.4 second of loading time from tube A including 1 second of duct cleaning then it carries out the exchange since the percentage is set to 10%
90% OF LOADING OF TUBE B	2 seconds of filling of tube B (not included in the total loading time) 21.6 seconds of loading time from tube B including 3 seconds of duct cleaning then it carries out another exchange. (difference between the total loading time and the loading time of tube A).

Sect.2. INSTALLATION OF AN OPTIONAL PROPORTIONAL VALVE

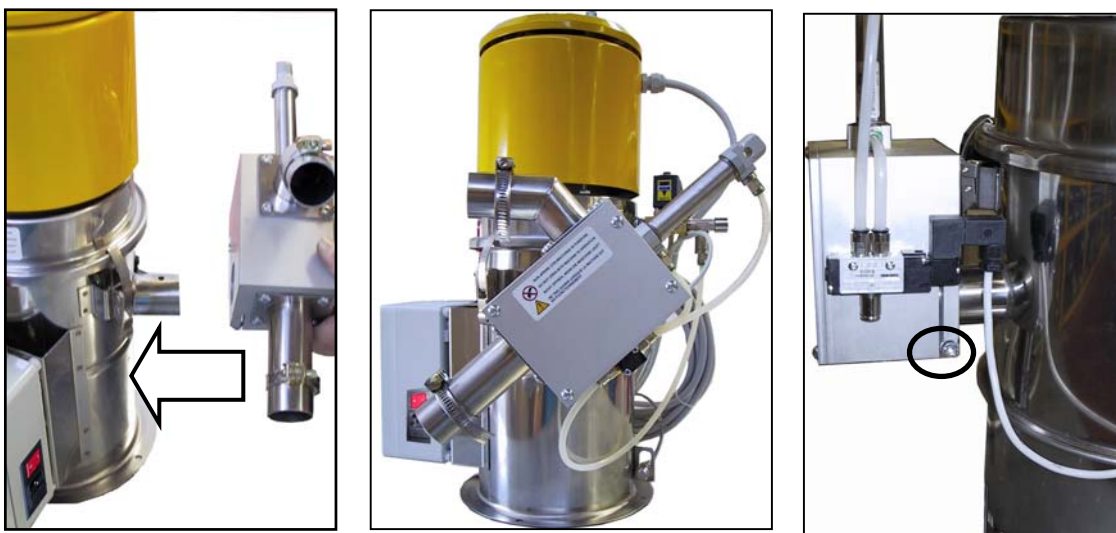
Sect.2.1. MECHANICAL CONNECTION



THE INSTALLATION AND STARTING MUST BE DONE BY SKILLED OPERATORS

1. Assure that the current on the transformer is switched off
2. Connect the valve to the suctioning pipe of the feeder, making sure that the fixing screw located on the valve is tightly fastened, because during functioning it is subject to vibrating. CHECK IN THE FIGURES BELOW THE SLANT OF THE VALVE.
3. Connect the supplied anti-static flexible pipe (that shall be able to transport the new material) to the valve top inlet pipe and then the pipe (that shall be able to transport the broken material) to the valve bottom inlet pipe, assuring that the two clasper stripes are hardly fixed.

MECHANICAL CONNECTION SERIES VPN



MECHANICAL CONNECTION SERIES VP

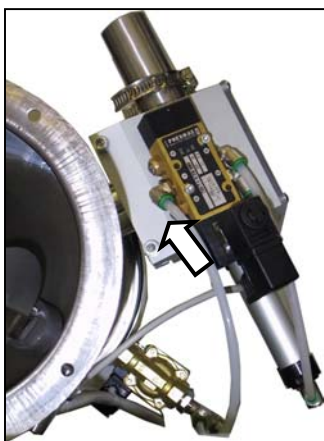
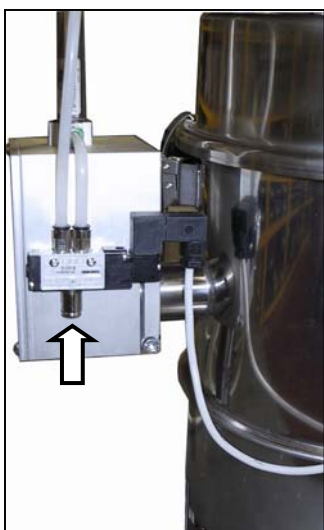


Sect.2.2. COMPRESSED AIR CONNECTION



BEFORE CONNECTING THE AIR SUPPLY, MAKE SURE THAT ALL PREVIOUS OPERATIONS HAVE BEEN CARRIED OUT CORRECTLY AND THAT THE ALUMINUM PANEL (VPN) OR THE PLEXIGLAS PANEL (VP) THAT CLOSES THE VALVE HAS NOT BEEN REMOVED.

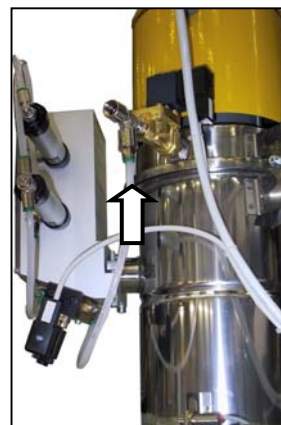
1. After carrying out the mechanical connection described above, insert in the filter cleaning solenoid valve the fitting supplied (see figures below).
2. Insert the tube of the solenoid valve of the proportional valve into the fitting just installed.
3. Connect the compressed-air supply to the replaced fitting (we recommend for the best and long operation a desiccator in the air system).



1

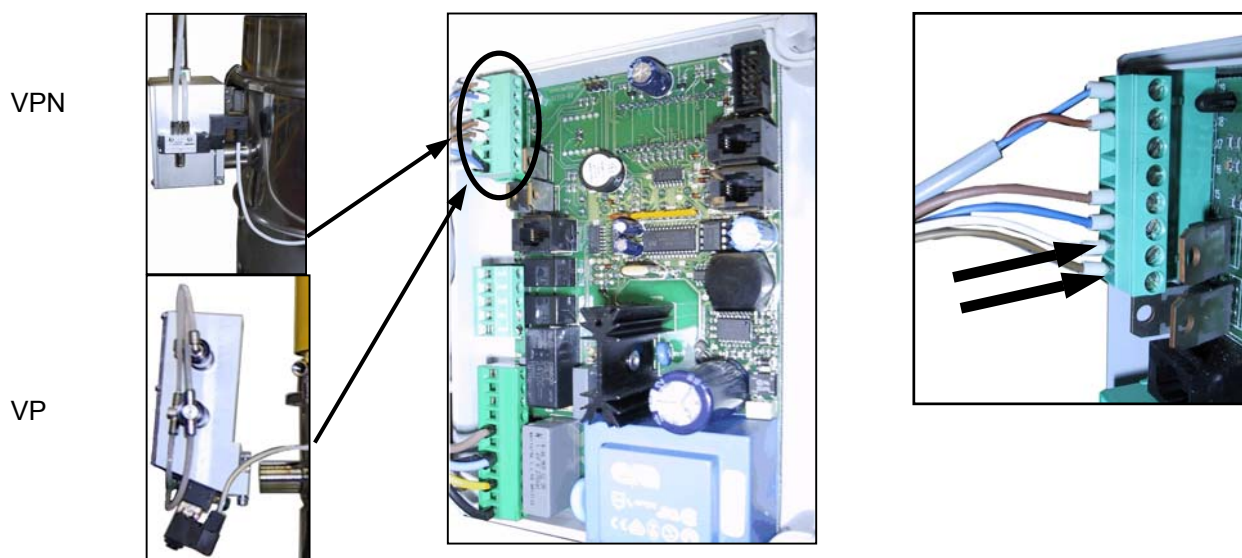


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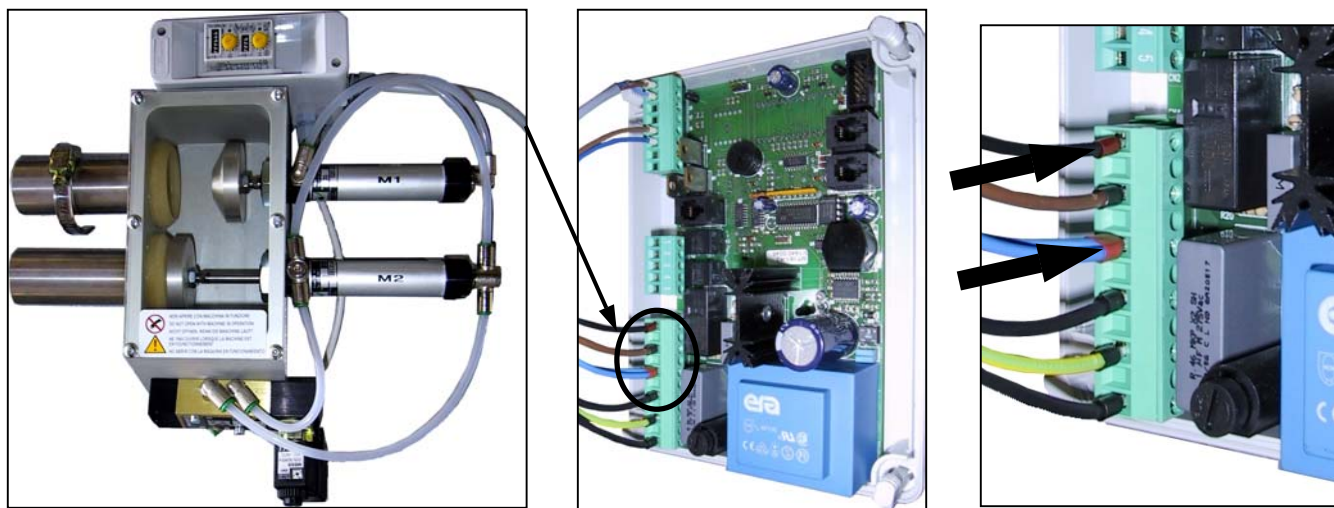
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INTERGRATED PROPORTIONAL VALVE ELECTRIC CONNECTION



In the cards of the standard feeders, the functions of the proportional valve are already enabled: therefore, after connecting the valve, just set the parameters of the proportional valve (SEE THE PREVIOUS TABLE WITH THE DESCRIPTION OF THE PARAMETERS).

ELECTRIC CONNECTION NON-INTEGRATED PROPORTIONAL VALVE



4. The supply tension is automatically supplied by the electronic timer (VP INTEGRATED: timer integrated with feeder card; VP NON-INTEGRATED: electronic timer external to feeder card) when the power is turned on.

Sect.3. INSTALLATION OF A PROBE WITH DUCT CLEANING VALVE

The probe with a duct-cleaning valve is required in case of long lengths of drawing of material, and - through this gate valve - air must be aspirated in order to draw all the material contained in the duct.

The total duct cleaning time is subtracted from the total loading time; therefore if the loading time is 20 s and the duct cleaning time is 5 s, the feeder will aspirate material for 15 seconds, after this the duct cleaning valve will open and air will be aspirated instead of material to empty the duct of the material.

THIS IS POSSIBLE ONLY IF THE DUCT CLEANING OPTION (P09) IS ENABLED

In case a proportional valve incorporated in the feeder is also installed, you can select the duct cleaning times for TUBE A and TUBE B. (P01 and P02)

N.B.: THE TERMINALS FOR THE CONNECTION OF THE TWO VALVES FOR DUCT CLEANING WILL BE ALWAYS THE SAME (16 AND 17). THEREFORE THE TWO SOLENOID VALVES WILL BE CONNECTED IN PARALLEL.

