



BOLDRORCHI

One century of experience and know-how.

1909 - 2009

JOB	FQ81032
CUSTOMER	DESMET BALLESTRA
CUSTOMER REF.	ORD.N°101083 C1E352
LOCATION	JAKARTA (INDONESIA)

INSTALLING, USE AND MAINTENANCE INSTRUCTIONS

BAG FILTERS AND CENTRIFUGAL FANS

VOL1



Div. Ecologia

 BOLDROCHI One century of experience and know-how.	JOB	FQ81032
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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	64FI		
AIR FLOW	170.000	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	140	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT	SABIZ		
TYPE OF DUST			
FILTER CODE	BCFC S D 35 60 14		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	60	
Number of bags for each valve	18	(max)
Total number of bags	822	
Filtering surface	1.462,7	[m ²]
Filtering velocity	1,94	[m ³ /m ² /min.]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	160	[mm]	
Lenght	3.500	[mm]	
Type of fixing	Snap Ring		
Weight	550	[gr/m ²]	
Filtering bag material	Acrylic		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 1/2 "	
Compressed air medium consumption	92	
Compressed air instant consumption	153	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	64F2		
AIR FLOW	65.500	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	65	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT	SABIZ		
TYPE OF DUST	GAS OF AIR -LIFT		
FILTER CODE	CBFC S D 35 40 90		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	19	
Number of bags for each valve	18	
Total number of bags	322	
Filtering surface	573,0	[m ²]
Filtering velocity	1,91	[m ³ /m ² /min.]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	160	[mm]	
Lenght	3.500	[mm]	
Type of fixing	Snap Ring		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 1/2 "	
Compressed air medium consumption	92	
Compressed air instant consumption	48	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	62FI		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT	SABIZ		
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	6	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	62K1
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	62F2		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	6	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	62K2
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	62F4		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	6	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	62K4
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	62F5		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY			

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 1/2 "	
Compressed air medium consumption	92	
Compressed air instant consumption	13	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	62K5
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65F2		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	6	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CUSTOMER DESMET BALLESTRA

CENTRIFUGAL FAN

ITEM	65K2
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65F9		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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	CUSTOMER	DESMET BALLESTRA

FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	6	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	65K4
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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	CUSTOMER	DESMET BALLESTRA

BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	64F3		
AIR FLOW	2.700	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	75	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 A		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	2	
Number of valves for each cells	5	
Number of bags for each valve	5	
Total number of bags	25	
Filtering surface	24,3	[m^2]
Filtering velocity	1,85	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	6	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	64k5
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Description	U.M.	Notes
Air flow	2700	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	3,4	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	5,5	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65F6		
AIR FLOW	1.550	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	90	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 35		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	3	
Number of bags for each valve	5	
Total number of bags	15	
Filtering surface	14,6	[m ²]
Filtering velocity	1,77	[m ³ /m ² /min.]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	3	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	65K6
------	------

Description	U.M.	Notes
Air flow	1550	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	2,2	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	3	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65F7		
AIR FLOW	1.550	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	90	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 35		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	3	
Number of bags for each valve	5	
Total number of bags	15	
Filtering surface	14,6	[m^2]
Filtering velocity	1,77	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	3	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	65K7
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Description	U.M.	Notes
Air flow	1550	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	2,2	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	3	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65F8		
AIR FLOW	1.550	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	90	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 35		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	3	
Number of bags for each valve	5	
Total number of bags	15	
Filtering surface	14,6	[m^2]
Filtering velocity	1,77	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	3	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1	-	-	
CC1	-	-	
RV1	-	-	
DC1	-	-	

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	65K9
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Description	U.M.	Notes
Air flow	1550	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	2,2	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	3	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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		CUSTOMER	DESMET BALLESTRA

BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65FI1		
AIR FLOW	1.550	m ³ /h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	°C
	MAXIMUM	90	°C
DUST CONCENTRATION	INLET	30	g/m ³
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 35		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	3	
Number of bags for each valve	5	
Total number of bags	15	
Filtering surface	14,6	[m ²]
Filtering velocity	1,77	[m ³ /m ² /min.]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	3	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1			
CC1			
RV1			
DC1			

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	65K8
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Description	U.M.	Notes
Air flow	1550	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	75	[°C]
Static head at temperature T		[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	2,2	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	3	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet

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BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	62F3		
AIR FLOW	1.550	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	90	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 20 35		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	3	
Number of bags for each valve	5	
Total number of bags	15	
Filtering surface	14,6	[m^2]
Filtering velocity	1,77	[$\text{m}^3/\text{m}^2/\text{min.}$]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	2.000	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	3	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1			
CC1			
RV1			
DC1			

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	

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CENTRIFUGAL FAN

ITEM	62K3
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Description		U.M.	Notes
Air flow	1550	[m ³ /h]	
Normal temperature T	35	[°C]	
Project temperature	75	[°C]	
Static head at temperature T		[mmca]	
Static head at temperature 20°C	350	[mmca]	
Velocity	2900	[giri/min]	
Adsorbed power at temperature 20°C	2,2	[kW]	
Arrangement	5		Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description		U.M.	Notes
Installed power	3	[kW]	
Number of poles	2 poles		
Power supply	400	[V]	
Frequency	50	[Hz]	
Motor start	STELLA / TRIANGOLO		

ACCESSORIES

Description		Notes
Silencer	NO	

Damper	-
Damper drive	Manual
Damper position	Outlet

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	CUSTOMER	DESMET BALLESTRA

BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65FI		
AIR FLOW	10.500	m^3/h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	$^{\circ}\text{C}$
	MAXIMUM	90	$^{\circ}\text{C}$
DUST CONCENTRATION	INLET	30	g/m^3
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S C P 30 2		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	6	
Number of bags for each valve	11	
Total number of bags	66	
Filtering surface	95,7	[m ²]
Filtering velocity	1,83	[m ³ /m ² /min.]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	3.000	[mm]	
Type of fixing	Snap Ring		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	7	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1			
CC1			
RV1			
DC1			

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	

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	CUSTOMER	DESMET BALLESTRA

BAG FILTER

LOCATION	JAKARTA (INDONESIA)		
ALTITUDE S.L.M.			
ITEM	65F10		
AIR FLOW	580	m ³ /h	
DP PRESSURE FILTER			
INLET TEMPERATURE	NORMAL CONDITION	40	°C
	MAXIMUM	90	°C
DUST CONCENTRATION	INLET	30	g/m ³
	OUTLET	10	[mg/Nm ³]
PLANT			
TYPE OF DUST			
FILTER CODE	MBC S D 15 33		
QUANTITY	1		

CONSTRUCTIVE DATA

Description	U.M.	notes
Project overpressure resistance	- 500	[mmca]
Number of rows of cells	1	
Number of cells for each row	1	
Number of valves for each cells	3	
Number of bags for each valve	3	
Total number of bags	9	
Filtering surface	5,5	[m ²]
Filtering velocity	1,75	[m ³ /m ² /min.]

MATERIAL

Description	Material	notes
Plenum	S235JR	
Bag filter body	S235JR	
Hopper	S235JR	
Steel Reinforces	S235JR	
bag filter structure	S235JR	
Handrailing, walkways and ladder	S235JR	

SUPERFICIAL TREATMENT

Description	notes
Preliminary	
Primer	
Finish coat	

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FILTERING BAG AND CAGES

Description		U.M.	notes
Diameter	152	[mm]	
Lenght	1.250	[mm]	
Type of fixing	lateral extraction		
Weight	550	[gr/m ²]	
Filtering bag material	Polypropylene		
Superficial treatment	-		
Cage material	Fe galvanised		
venturi material	Alluminium		
Type of construction	One pieces		

CLEANING SYSTEM

Description		notes
Valve diameter	1 "	
Compressed air medium consumption	39	
Compressed air instant consumption	3	
Electrovalve voltage	24 V DC	

DUST EVACUATION SYSTEM

ITEM	Description	Installed power	notes
SC1			
CC1			
RV1			
DC1			

OTHER ACCESSORIES

Accessories	Presence S/N	notes
Membrana di sfogo	NO	
Cavo segnalatore di rottura per membrane	NO	
Sensore di temperatura aria ingresso filtro	NO	
Indicatore di livello in tramoggia	NO	
Sensore di rotazione organi di scarico	NO	



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CENTRIFUGAL FAN

ITEM	65K5
------	------

Description	U.M.	Notes
Air flow	550	[m ³ /h]
Normal temperature T	35	[°C]
Project temperature	40	[°C]
Static head at temperature T	75	[mmca]
Static head at temperature 20°C	350	[mmca]
Velocity	2900	[giri/min]
Adsorbed power at temperature 20°C	0,8	[kW]
Arrangement	5	Simple aspiration. For direct drive. Impeller overhung on motor shaft. No bearings on fan. Motor mounted on base or supported by fan housing.

ELECTRIC MOTOR CHARACTERISTICS

Description	U.M.	Notes
Installed power	3	[kW]
Number of poles	2 poles	
Power supply	400	[V]
Frequency	50	[Hz]
Motor start	STELLA / TRIANGOLO	

ACCESSORIES

Description	Notes
Silencer	NO

Damper	-
Damper drive	Manual
Damper position	Outlet



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LIST OF ATTACHED DOCUMENTS

1)	BAG FILTER INSTALLING, USE AND MAINTENANCE INSTRUCTIONS
2)	CENTRIFUGAL FAN INSTALLING, USE AND MAINTENANCE INSTRUCTIONS
3)	SPARE PARTS
4)	ELECTRICAL DRAWINGS AND SCHEMES
0)	vol.2
5)	LAYOUT AND MECHANICAL DRAWINGS
6)	
7)	
8)	
9)	
10)	
11)	
12)	
13)	
14)	
15)	
16)	
17)	
18)	
29)	



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1)

BAG FILTER INSTALLING, USE AND MAINTENANCE INSTRUCTIONS



ASSEMBLING, USE AND
MAINTENANCE MANUAL
FOR BAG FILTERS
SERIES MBC
SERIES MBCC

INSTALLATION, USE AND MAINTENANCE MANUAL		
REVISION 0	DATE	26/11/08
Drawn up	Checked	Verified
A.S.	StAn	RoRa

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1 Generalities

1.1 Safety Warnings and Notices



Attention

Possible damages to the machine, danger of death and accidents for people.

1.2 Safety Warning

- Never set damaged products at work.
- Read these instructions carefully before starting handling, installation and maintenance operations.
- Live and moving parts of electrical machines can cause serious or mortal wounds.

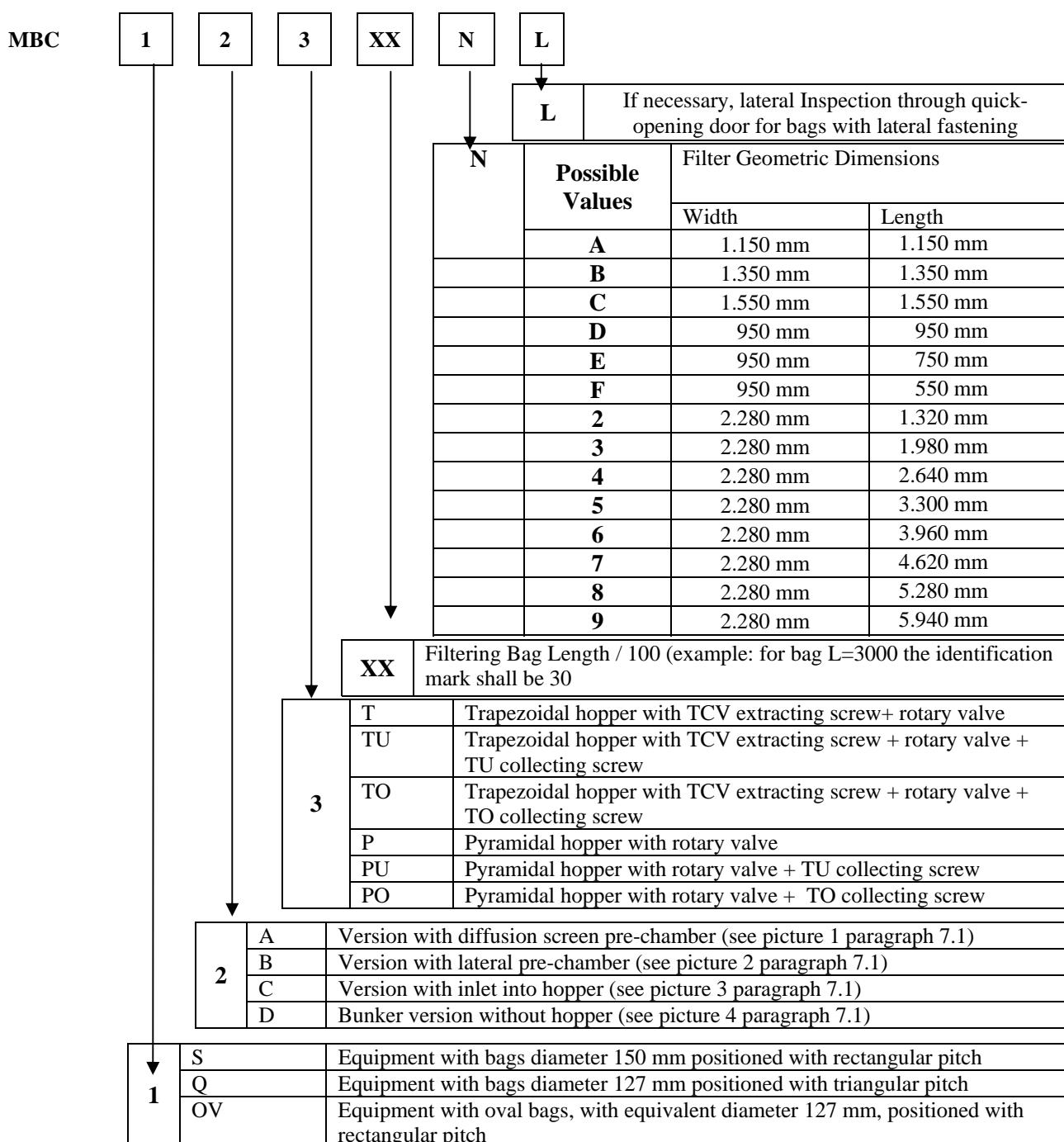
2 Summary of the Marking Data of the Filtert

This chapter will explain the marking data of the bag filter, guarantee conditions and reference regulations.

2.1 Meaning of the Identification Marks

2.1.1 Identification of a Filter Series MBC

The identification procedure of a bag filter series MBC is indicated below:



As you can see, the key elements for the identification of a bag filter series MBC are the following ones:

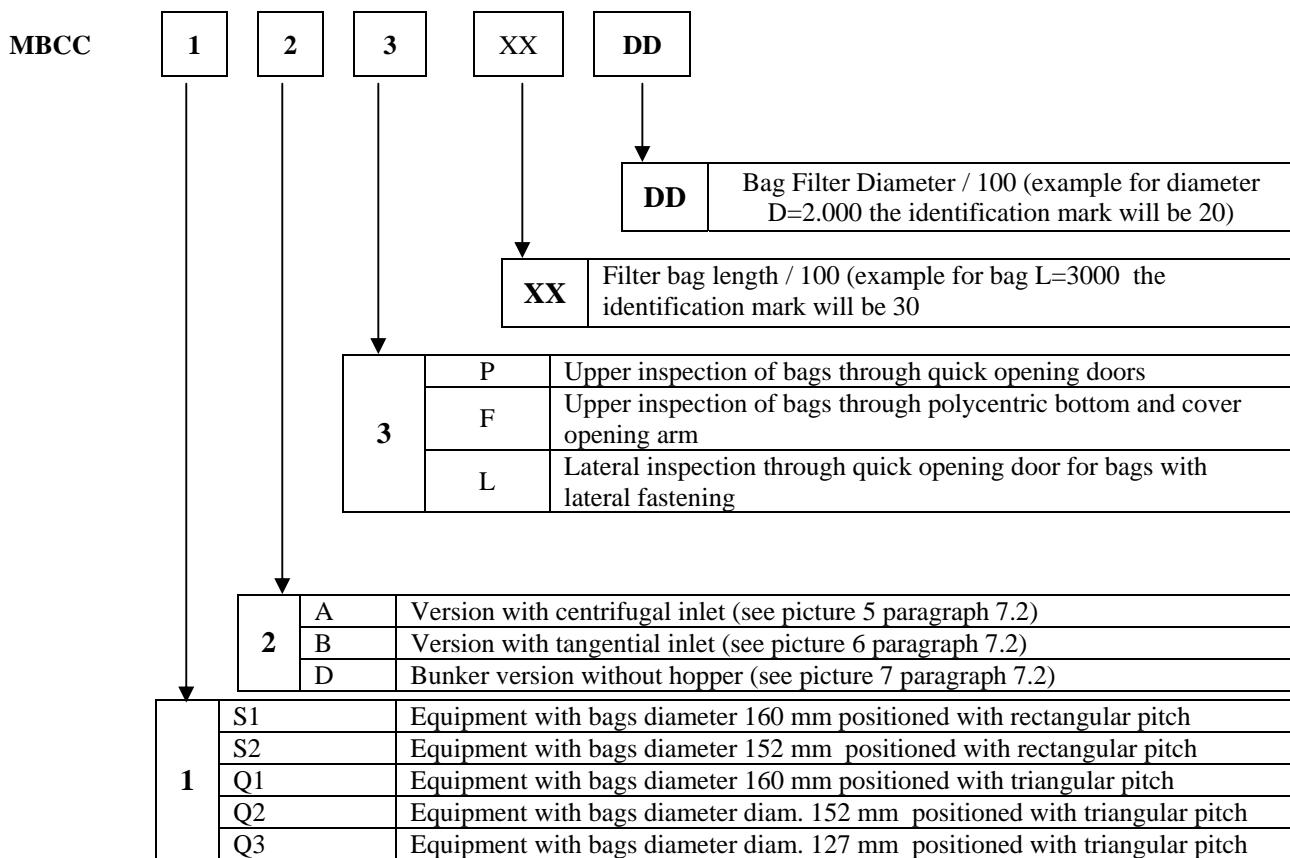
- geometric dimensions of the filtering bag and position of the bags in the tube sheet (diameter and position for character **[1]**; bag length for character **[L]**);
- filter type and possible presence of pre-chamber (character **[2]**);
- hopper type and operating plan of discharge components (character **[3]**)
- geometric dimensions (plan view) of the bag filter

For example, the bag filter MBC S-C-T 30 7 will have the following characteristics:

- positioning of bags with rectangular pitch with diameter 152 mm;
- version without pre-chamber, with hopper inlet;
- trapezoidal hopper with TCV screw conveyer at the outlet + rotary valve;
- bag length equal to 3.000 mm;
- geometric dimensions 2.280 x 4.620 mm

2.1.2 Identification of a Filter Series MBCC

The identification procedure of a bag filter series MBCC is indicated below:



Also in this case, the key elements for the identification of a bag filter series MBCC are the following ones:

- geometric dimensions of the filtering bag and position of the bags in the tube sheet (diameter and position for character [1]; bag length for character [L]);
- filter type (character [2]);
- maintenance type and position of opening doors (character [3])
- filter diameter

For example, the bag filter MBCC Q3-A-L 25 13 will have the following characteristics:

- positioning of bags with triangular pitch with diameter 127 mm;
- version with centrifugal inlet;
- lateral inspection through quick opening door for bags with lateral fastening;
- bag length equal to 2.000 mm;
- geometric dimensions 2.280 x 4.620 mm
- bag filter diameter: 1.300 mm.

2.2 Guarantee

The bag filters, manufactured by the Company BOLDROCCHI S.r.L. Division ECOLOGIA, are guaranteed against defects due to materials and labour for a period of 6 months after the setting at work of the plant (at the latest 9 months after the notice of ready goods).

During this period the manufacturer guarantees the replacement or repair of detective parts, by his choice, and the repair of any failures without charges for the purchaser.

This guarantee is valid only provided that the bag filter is installed and used according to the manufacturer's instructions indicated in this manual.

The guarantee immediately lapses in case the filter is used incorrectly or against the manufacturer's instructions or if modifications and/or repairs are carried out by personnel not authorized by BOLDROCCHI S.r.L. Division ECOLOGIA., or without their written authorization.

The manufacturer accepts no responsibility for possible damages caused to persons and/or property owing to misuse, tampering or incorrect maintenance of the filter.

In order to facilitate the request for service and/or spare parts, please, fill in each part of the table for the request for spare parts (see example below) and communicate the data to the service of BOLDROCCHI S.r.L. Division ECOLOGIA. More details about the request for spare parts and the table for the request for spare parts are reported in chapter 13 (paragraph 13.1).

2.3 References to Effective Laws and Regulations

The filtering equipment described in this manual has been designed and assembled according to the regulations in force in the field of machine manufacture. The laws and regulations applied by the manufacturer are listed below:

CEI 60439/1: “Assembled Protection and Control Low-Tension Equipment (LT Control Boards.). Part 1: Requirements for Standard Equipment (SE) and Not Standard Equipment (NSE)”;

CEI 64-8: “Users’ Electrical Equipment with Tension not over 1000 V in Alternating Current And At 1550 V in Indirect Current”;

EN 60204-1: “Machine Safety. Machine Electrical Equipment. Part 1: General Rules”

UNI EN ISO 12100-1 “Machine Safety. Basic Concepts, General Design Principles. Terms, Basic Methods”;

UNI EN ISO 12100-2 “Machine Safety. Basic Concepts, General Design Principles. Specifications And Technical Principles”;

98/37/CEE: Machine Directive, as modified by the Directives **89/392/CEE , 91/368/CEE, 93/44/CEE e 93/68/CEE**;

94/9/CE: Atex Directive (if applicable);

BT 73/23/CEE: Low-Tension Directive, as completed by **93/68/CEE**;

EMC 89/336/CEE: Directive of Electromagnetic Compatibility, as completed by **91/31/CEE and 93/68/CEE**;

D.lgs. 81/2008: “Health and Safety in Work Sites”, and Following Modifications.

3 Manual Use and Retention

This chapter supplies the indications about the receivers, the aims and the retention place of this manual.

IMPORTANT

Before installation, setting at work or any maintenance operation, carefully read this manual.

All data, drawings, pictures reported in this manual are confidential technical information and can't be, even partially, copied without the written authorization of the manufacturer who is the sole owner and reserves the right, in a constant search for innovation and technological quality, to carry out the necessary modifications without notice requirement.

Any, even partial, copy of this manual, without prior written authorization of the Company BOLDROCCHI S.r.L. Division ECOLOGIA is forbidden.

3.1 Use of the Installation, Use and Maintenance Manual

This manual shall be carefully consulted by everybody coming into contact with the filter during the various stages of its operating life, that is:

- Filter users;
- Handling and transport personnel;
- Installation personnel;
- Maintenance personnel;
- Final dismantling personnel.

This manual contains all information required for installation, correct operation and the necessary maintenance operations to be carried out to assure the operators' safety during the stages of the filter life and its best performance.

This manual has been drawn up to indicate the use of the filter according to the design plan and the technical indications, to supply the instructions about transport, handling, installation, assembling, adjustment, use and maintenance and the information for personnel training, to make the order of spare parts easier and to supply indications about residual risks.

3.2 Manual Retention

The installation, use and maintenance manual is to be considered as integral part of the filter and shall be retained, for future references, till the final dismantling of the filter.

The manual shall be retained near the plant to be always available for consultation and preserved in a protected, dry place, sheltered from the sun.



In case of damage of this manual, the user can ask the filter manufacturer for a new manual in the place of the damaged one by contacting the company:

BOLDROCCHI S.r.L. Division ECOLOGIA
Viale Trento e Trieste, 93
20046 BIASSONO (MI)
Tel.: (039) 22021 – Fax.: (039) 2754188
e.mail.: info@boldrocchiecologia.com

The manufacturer reserves to ask for the return of the damaged manual at the delivery of the new one. The manufacturer has the right to update production and manuals, without having to update the previous production and manuals, but for exceptional cases. The purchaser can request and receive any updating of this manual or its supplements that shall be considered integral part of the manual. The purchaser can request supplementary information besides the one indicated in this manual by contacting the manufacturer. The supply of alternative and/or supplementary manuals shall be agreed with the sales department of the company BOLDROCCHI S.r.L. Division ECOLOGIA.

The purchaser can submit the manufacturer's proposals and indications aiming at improving the manual itself.

In case the filter is sold to others, the purchaser shall inform the manufacturer of the new owner's name and address to allow the transmission of any supplements of the manual to the new purchaser.

3.3 Manufacturer's Rights

The manufacturer considers himself released from any responsibility in the following cases:

- Filter misuse;
- Use against the specific national standards;
- Filter use by not qualified personnel;
- Incorrect installation, if not carried out by personnel of BOLDROCCHI S.r.L. Division ECOLOGIA or by personnel authorized by them;
- Supply defects;
- Serious faults in the planned maintenance;
- Unauthorized modifications or interventions;
- Use of non original spare parts;
- Total or partial disregard of the instructions indicated in this manual;
- Exceptional events.

4 First Aid Directions

This chapter will supply, although not exhaustively, the operating directions in case of accident (Standard CEI EN 650519-1 at point 15.3.2, Machine Directive About Safety and Health).

The following directions are gathered from:

“FIRST AID NOTIONS” – Manual of the Italian Red Cross

4.1 First Aid

The **First Aid** is the aid given to one or more accident and/or indisposition casualties, waiting for a doctor or qualified personnel (ambulance).

The first aider shall never replace the doctor.

To give **First Aid** means:

- To avoid rash and/or harmful actions;
- To avoid the worsening of the injured person’s conditions;
- To protect the injured person from further risks;
- To help the injured person’s survival;
- To be able to distinguish the *urgent* cases from serious, but not urgent cases.

URGENCY:	<p>The injured person’s life is in danger; his vital functions (breath, heartbeat and blood circulation) are jeopardized. It’s necessary to intervene immediately. Therefore urgency is always extremely serious.</p>
GRAVITY:	<p>The gravity doesn’t necessarily imply urgency. There are extremely serious situations (for ex. suspected backbone fracture) that can wait. The conditions of the injured person could be irremediably worsened by a rash and hurried aid. It’s advisable not to move the injured person and to calmly organize the aid and the transport.</p>

4.2 What Shall Always Be Done

In case of accident with injured persons it’s necessary to observe the following directions:

- Keep the crowd away to assure a free space around the injured person;
- Carry out a careful examination of the injured person:
 - Immediately check the injured person’s vital functions;
 - Consider the mechanics of the accident;
 - Reassure the injured person, if he is conscious;
 - Avoid any remarks about the injured person’s state, even if he appears unconscious
- Call assistance:
 - Specify the accident site;
 - Indicate the number of injured persons;
 - Describe the injured persons’ state in detail, starting from the most serious one;
- Carry out the proper operations to cope with the urgency and/or the gravity.
- Assure the injured person’s transport, to be carried out exclusively by the assistance (ambulance). Don’t leave the injured person till he is put into the care of qualified personnel (medical, auxiliary medical personnel).

4.2.1 Injured Person's Examination

The first thing to do during the injured person's examination is to verify if he is **conscious** or **unconscious**.
The injured person can be:

CONSCIOUS: he answers questions and/or responds to stimuli;

UNCOSCIOUS: he doesn't answer questions and doesn't respond to stimuli

4.2.2 Unconscious Injured Person

If the injured person is unconscious, it's necessary to verify immediately if there is respiratory activity.

In order to ascertain if the injured person spontaneously breathes, check if:

- He rhythmically raises his thorax;
- He has a normal colour of skin, lips, nails and ears;
- The aider feels the injured person's breath (the aider brings his cheek or wrist near to the injured person's nose, or brings a polished surface near to the injured person's nose and notices its tarnishing);
- The heart is beating.

The injured person doesn't breath spontaneously if:

- his thorax is immobile;
- he has a cyanotic (bluish) colour of skin, lips, nails;
- no breath is noticed
- **the heart can still beat.**

In order to ascertain if there is heartbeat, the aider shall check the *carotid-pulse*, by placing two fingers of one hand (index and middle finger) near the injured person's trachea, beside the Adam's apple.

4.3 Breathing Unconscious Injured Person

It's the case of the "loss of consciousness", where the vital functions are maintained.

Anyway, the aider shall protect the injured person from the risks of suffocation.

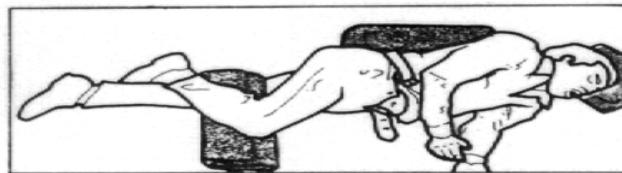
4.3.1 Serious Mistakes to Avoid

- **Putting an unconscious injured person in sitting position:** his head would fall forward and he couldn't breath well;
- **Letting an unconscious injured person on his back:** his tongue, relaxing in an unconscious person, would occlude his respiratory tract;
- **Giving to drink to an unconscious person:** since he doesn't control swallowing, he would suffocate.

4.3.2 What Shall Be Done

Protect the **breathing unconscious injured person** from risks of suffocation, by adopting the **LATERAL SAFETY POSITION**.

In order to place the injured person in the lateral safety position it's necessary: to lay him on his flank with his arms outstretched together on the same side. The head, turned on one side as well, shall be laid down on a low makeshift pillow and be bowed backwards (in this way his tongue allows the passage of air). The leg resting on the ground shall be outstretched, the other shall be with bent knee with the foot tip on the calf of the underlying limb (see picture below).



Conscious injured persons can also be laid in this position, in case the wait for the assistance is particularly long. In this way the worsening of the injured person's conditions or the suffocation due to unconsciousness, vomit or haemorrhage is prevented.

ATTENTION:

Attention to the suspected backbone fracture (it can be suspected in case of a violent accident).

ATTENTION:

NEVER PLACE AN INJURED PERSON WITH SUSPECTED BACKBONE FRACTURE IN THE LATERAL SAFETY POSITION.

ABSOLUTELY AVOID MOVING.

After giving the alarm, remain near the injured person and check his breathing.

If he doesn't breath, don't risk the hypertension of the head (that could be dangerous owing to possible fractures of cervical vertebrae). Only draw out his tongue with a dry handkerchief (failing breathing could depend on the position on his back). If this isn't enough, give artificial respiration.

4.4 Not Breathing Unconscious Injured Person

The aider shall urgently give ARTIFICIAL RESPIRATION.

4.5 Heart Failure

The heart failure can be the consequence or cause of the cessation of breathing.

The aider can suppose that the injured person is in heart failure if he:

- is unconscious;
- doesn't breathe;
- the heartbeat fails (not perceptible carotid-pulse near the trachea);
- mydriasis (dilated pupils);
- failing palpebral reflex.

Even in presence of the above mentioned conditions, the death state can't be absolutely certain. It can be defined "*Apparent death*".

DON'T ABSOLUTELY WAIT FOR A COMPLETE MYDRIASIS. IMMEDIATELY START THE HEART MASSAGE.

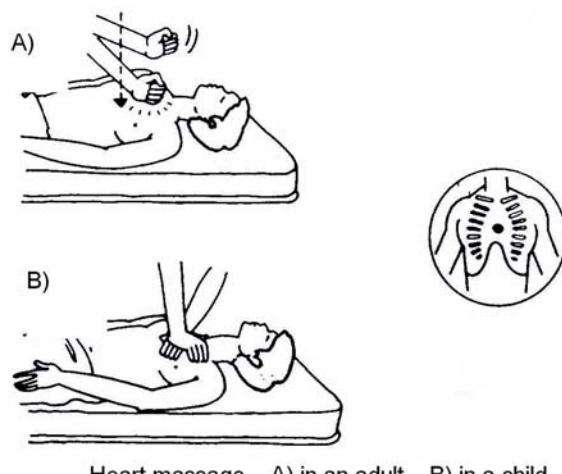
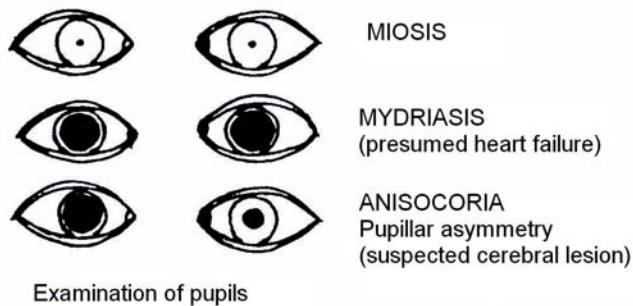
The heart massage shall always be combined with the artificial respiration. Only both operations assure a correct REANIMATION.

If the aiders are two, for a correct reanimation, one shall give artificial respiration and the other shall carry out the heart massage.

The two aiders shall:

- kneel near the injured person one facing the other (with the injured person in the middle) to avoid to interfere with each other;
- lay the injured person on a stiff plane;
- place the injured person's head in hypertension;
- the aider carrying out the heat massage shall give a punch on the injured person's thorax on the two lower thirds of his breast-bone;

- the aider giving artificial respiration shall carry out two or three insufflations;
- the aider performing the heart massage carries out fifteen thoracic compressions, by placing his hands on the injured person's breast-bone.



4.6 Artificial Respiration

Oral or Insufflating Methods: mouth-to-mouth

Mouth-to-nose

Mouth-to-mouth nose

MOUTH-TO-MOUTH Method

Preliminary Operations

- Check heart function (check the carotid-pulse near the trachea)
- Remove possible obstructions from the mouth
- Untie constrictive clothing and remove everything crushing the thorax
- Place the head in HYPERTENSION: the head turned backwards with the chin upward (this position allows to move the tongue relaxing in the injured person placed on his back and occluding the respiratory tract and helping the passage of the air)
- Close between thumb and index the injured person's nose and lay the side of the same hand on his forehead. The other hand can be placed under his nape to help the head hypertension or on his chin to help the opening of his mouth
- Apply the mouth on the injured person's mouth and cover it completely
- Insufflate every 4-5 seconds; between an insufflation and the following one, slightly rise to inhale and turn the head to see the injured person's thorax. Meanwhile the injured person exhales.
- Check his pulse
- Go on till the autonomous restarting of the respiratory activity (meanwhile, if the operation has been successful, the cyanosis gradually disappears).



MOUTH-TO-NOSE Respiration

After the head hypertension the aider takes into his mouth the whole nose of the injured person; with a hand he presses on the injured person's forehead, with the other he pushes on his chin and closes his mouth.



4.7 Electrocution

First Aid:

Turn off the power. If it isn't possible to near the electrocuted person, move him by touching him only with a wooden stock, a broom stick, a wooden board. **Metals are conductive.** Attention to humidity: **water is conductive.** Insulate from the ground. Never forget this precaution! The effects of current are various. The injured person remains conscious after a simple "shock".

But the current can cause unconsciousness.

Breathing Unconscious Person: Lateral Safety Position (transport to hospital).

NOT Breathing Unconscious Person: Artificial Respiration.

(In case of failing pulse also Heart Massage).

Attention:

in case of high-tension electrocuted person, don't go nearer than 20 meters. Only alarm.

4.8 Burns

They are skin lesions due to physical agents (heat, rays, electricity) or to chemical agents (acids, strong bases).

In case of heat they can be caused by dry heat (fire, electricity, etc.) or wet heat (vapour, boiling water, oil, etc.).

Burns of 1st Degree:

Characterized by "erythema" or skin-rash, like the typical sunburn.

First Aid:

Compresses of cold water, in case of fever give an antipyretic.

Burns of 2nd Degree:

Characterized by the formation of blisters (**phlyctenas**). Phlyctenas are full of liquid, they **shan't be holed**.

First Aid:

Dip the part into cold water, give to drink. Sterile gauze. Never surgical cotton, never alcohol. Don't put ointment on it. When the blister bursts, proceed to dress it like a wound. Use tubular nets to keep the lesion aired.

ATTENTION:

Burns that are larger than a coin shall be dressed in a hospital's casualty ward. For dressing at home follow the hospital indications. Use tubular nets. ATTENTION! Burns become easily infected!!!

Burns of 3rd Degree:

They cause the necrosis (death) of tissues.

First Aid:

don't remove clothing if they are stuck to the skin, cover lesions with sterile gauze or an extremely clean piece of cloth. Take to hospital at once. Give a lot to drink. Place in the Antishock Position.

4.9 Foreign Matters in the Eye

First Aid:

1. Don't rub the eyes
2. let the eyelid move under running water (for ex. in case of sand)
3. if it's a mobile and visible matter, it can be removed as follows:
 - carefully wash one's hands; go near a light source; drop the lower eyelid and remove it with the corner of a clean handkerchief.
4. if the foreign matter is fixed (for ex. a sprinter) don't try to remove it: **cover both eyes** (even the sound one) and take to a hospital (if possible to an eye hospital) with an ambulance or anyway lying with immobile head.

5 First Intervention in Case of Fire or Explosion

This chapter will supply, although not exhaustively, the operating directions in case of fire or explosion (Standard UNI-EN 1127-1).

5.1 Fire and Explosion, Elements and Definitions

The explosion, according to the Standard UN1127-1, is a rapid reaction of oxidation or decomposition producing an increase in temperature, pressure or both simultaneously, with development of heat, smoke and hot gases.

In order to activate a process of combustion and therefore an explosion, the co-existence of three basic elements is required:

- The comburent;
- The fuel;
- The ignition source.

The wide field of combustions can be divided into three large groups:

- Homogeneous combustion, involving gaseous substances (gas + gas);
- Heterogeneous combustion, involving solid and liquid substances (solid + gas or liquid + gas);
- Combustion of condensing systems (explosive).

From the physical point of view, combustion mainly determines an increase in temperature of the environment where an explosion develops. Temperature reaches in short extremely high temperatures (1000°C).

The products of combustion, together with the substances in the atmosphere, even if they aren't involved in the oxidation process, expand at high temperatures and activate a flow of fresh air allowing to maintain combustion. As previously mentioned, the development of an explosion requires the co-existence of the three above mentioned elements, in the stoichiometric percentages.

Failing just one of the three components, no combustion develops, that means that failing one of them, extinction occurs because of the following three factors:

- Fuel exhaustion;
- Oxygen failure;
- Temperature drop below the ignition temperature.

The products of combustion have got a varied composition.

According to the composition of combustible substances and the development of the combustion process in general we define:

- **flame**, the combustion occurring in the gaseous phase;
- **heat**, the thermal energy developed during the combustion process;
- **hot gases**, the mixture of gases and vapours in the atmosphere before combustion or as result of heating and combustion;
- **fumes**, the dispersion in the air of thin carbon particles and other solid or liquid substances produced by an incomplete combustion.

5.2 Extinguishing Agents

The extinguishing agents are chemical substances with the property to act on the combustion system to stop the phenomenon by modifying the limits of the oxidation process and setting them at values preventing the development of the process itself.

Various extinguishing substances have these characteristics, but not all can be used for this function.

In practical applications, to avoid misuse, five fire classes have been identified:

1. **Class A:** fire of solid materials burning with incandescence;
2. **Class B:** fire of liquids;
3. **Class C:** fire of gases;
4. **Class D:** fire of metals;
5. **Class E:** fire of class A and D in presence of electric current.

For fires of *Class E*, **carbon dioxide (CO₂)** is used as extinguishing agent.

In standard conditions, carbon dioxide is a colourless, odourless, non-toxic gas that is, however, asphyxiating in concentrations over 15 %. It's used to make inflammable mixtures inert. Owing to its low conductivity, it is used in extinguishing fires in presence of live electric equipment.

5.2.1 Use Limits

Owing to its characteristics, carbon dioxide is not effective to extinguish substances containing oxygen in their molecular structure.

It can't be used in the extinction of fires of reactive metals (sodium, potassium, magnesium, titanium, zirconium, uranium, plutonium, etc.) and metallic hydrides for their carbon dioxide decomposition action.

5.3 Behaviour in Case of Explosion or Fire

In case of fire keep to the following standards:

- Immediately alarm and remove any person in dangerous areas.
- Clear the machine and the electric equipment in the fire area and in the immediate vicinity.
- Stop ventilation and conditioning plants.
- Operate the fixed fire devices and check the intervention of automatic fire devices, if any.
- Operate the movable fire devices (extinguishers, nozzles, etc.).
- Limit the fire as much as possible, by removing flammable material that could be reached by the fire.
- Ask for the intervention of the fire-brigade.
- After the fire extinction ascertain there is no concealed focus.
- Activities can restart only after checking the efficiency of plants.

6 Filter Technical Description

A bag filter is the equipment for the dust collection of an air flow intercepted in one or more points and conveyed through an inlet pipe into the dust collecting filter by a suction fan. The fan is positioned after the bag filter because of the possible wear of the impeller due to the sucked air. The bag filter inside is therefore in suction pressure.

The static head supplied by the centrifugal fan positioned after the filter is clearly the result of the sum of the pressure drop occurring in the crossing of filter bags (equal to about 150-200 mm column of water) and the distributed pressure drops (pipe inner roughness) and accidental pressure drops (inlets, bends, pipe fittings) in the whole air flow circuit.

The air freed from the coarser fraction crosses the real filtering section consisting of filter bags made of felt tubular bags with a bottom sewed at the lower end and an elastic ring inserted in the flap at the upper end to assure perfect tightness between the chamber of the dusty gas and the chamber of the cleaned gas.

During filtration the cylindrical shape of the bag is assured by a carbon steel wire cage positioned inside each single bag; in the cage upper part a Venturi ejector assures the complete use of the regeneration energy applied by means of a compressed air pulse.

The casing containing the filter equipment is made of steel sheet with suitably stiffening profiles dimensioned to allow the casing to resist design pressure. In designing the bag filter, as usual in applications of this type, no profile has been positioned inside the filter to avoid dust deposits. Therefore, stiffening profiles are all welded outside the sheet.

The air crosses bags from outside to inside and bottom-up and is sucked again above by the plenum. The operation of the bag filter plant is assured by a fan positioned after the bag filter.

In the pre-chamber there is a first stage of dust collection through the effect of the force of gravity; the sucked air enters a chamber where a sudden slowing down occurs; dust particles, especially the ones with bigger granulometry, deposit through the effect of the force of gravity in the underlying hopper.

The dedusted air is sent to a chimney dispersing it in the atmosphere.

The assembling of bag filters shall strictly follow the indications reported in the use and maintenance manual of the bag filter.

The lower part of the filter casing consists of a dust collection hopper provided with discharge devices, if any:

- screw conveyor for dust extraction from the hopper and conveyance to a single point;
- Tight rotary valve.

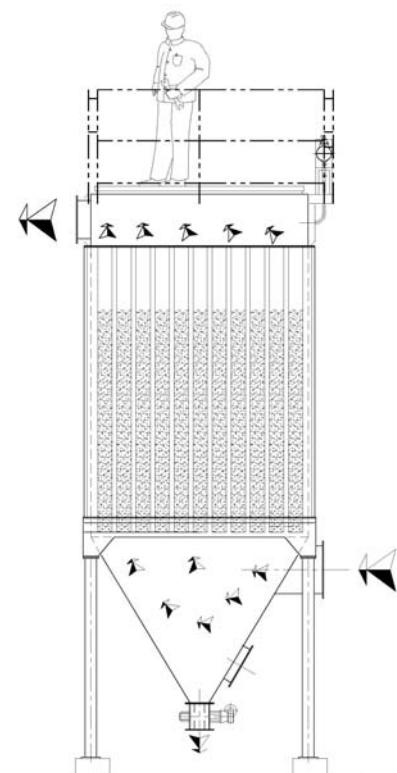
Besides, the filter is provided with stable supporting steel structural works complete with suitable braces and an access side door to allow all inspection and maintenance operations.

6.1 Bag Filter Series MBC

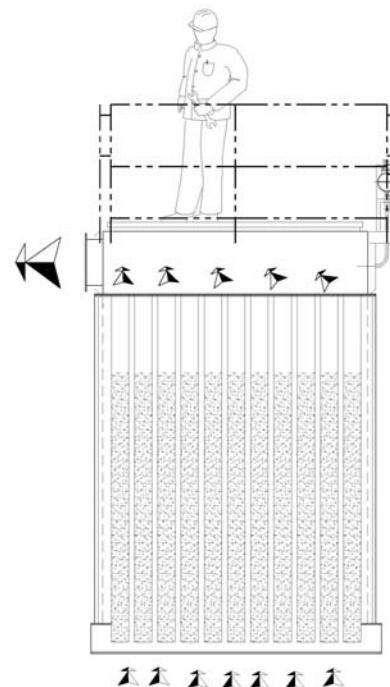
The above descriptions essentially refer to the filters MBC with rectangular base.

The air inlet in the bag filter can happen according to various operating configurations (see pictures 4-5-6-7).

FILTERS WITHOUT PRE-CHAMBER



Picture 4: Inlet Into Hopper



Picture 5: Filter With A Bunker-Like Silo

The type represented in picture 4 implies an inlet into hopper, while the type indicated in picture 5 concerns vent filters on silos or other equipment. That filter is called bunker filter and is flanged above the silos through a base flange.

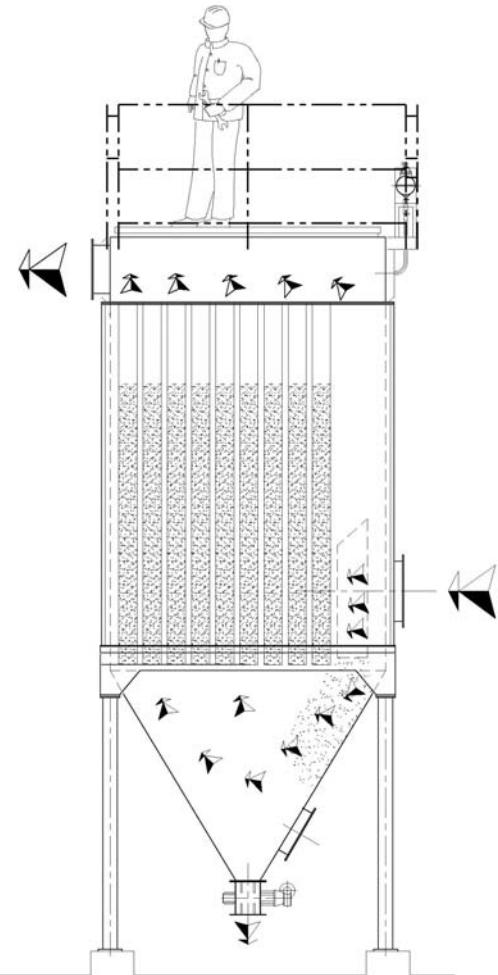
Direct inlet into hopper (picture 4) is not recommended if there is:

- big dust load in inlet air flow;
- abrasive dust.

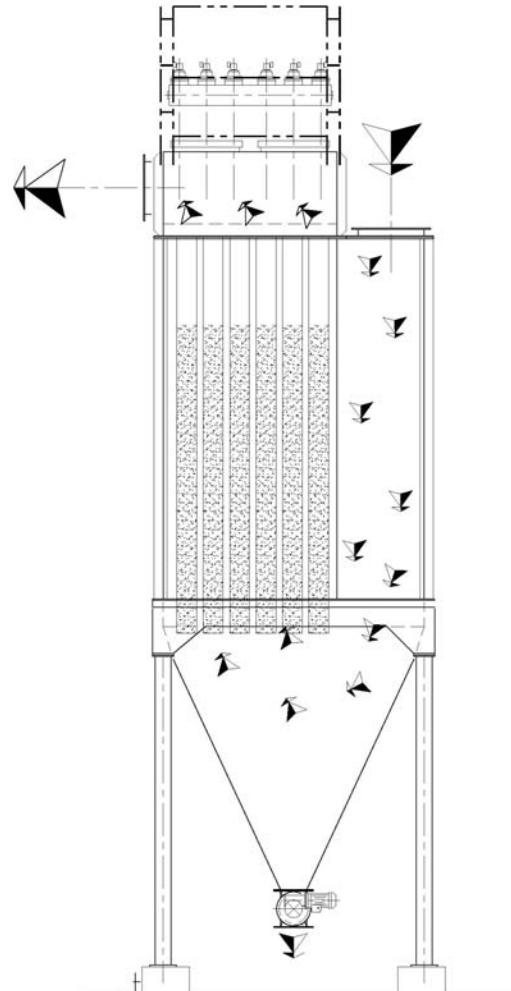
In this case there are two possible solutions, with a prechamber for the separation of the most coarse dust fraction.

In this way the dust load in the bags is reduced, limiting the filtering bags usury and the use of cleaning compressed air.

FILTERS WITH PRE-CHAMBER



Picture 6: Screen Pre-Chamber



Picture 7: Side Pre-Chamber

The types represented in picture 6 and 7 include the use of a pre-chamber for the collection of the coarse fraction.

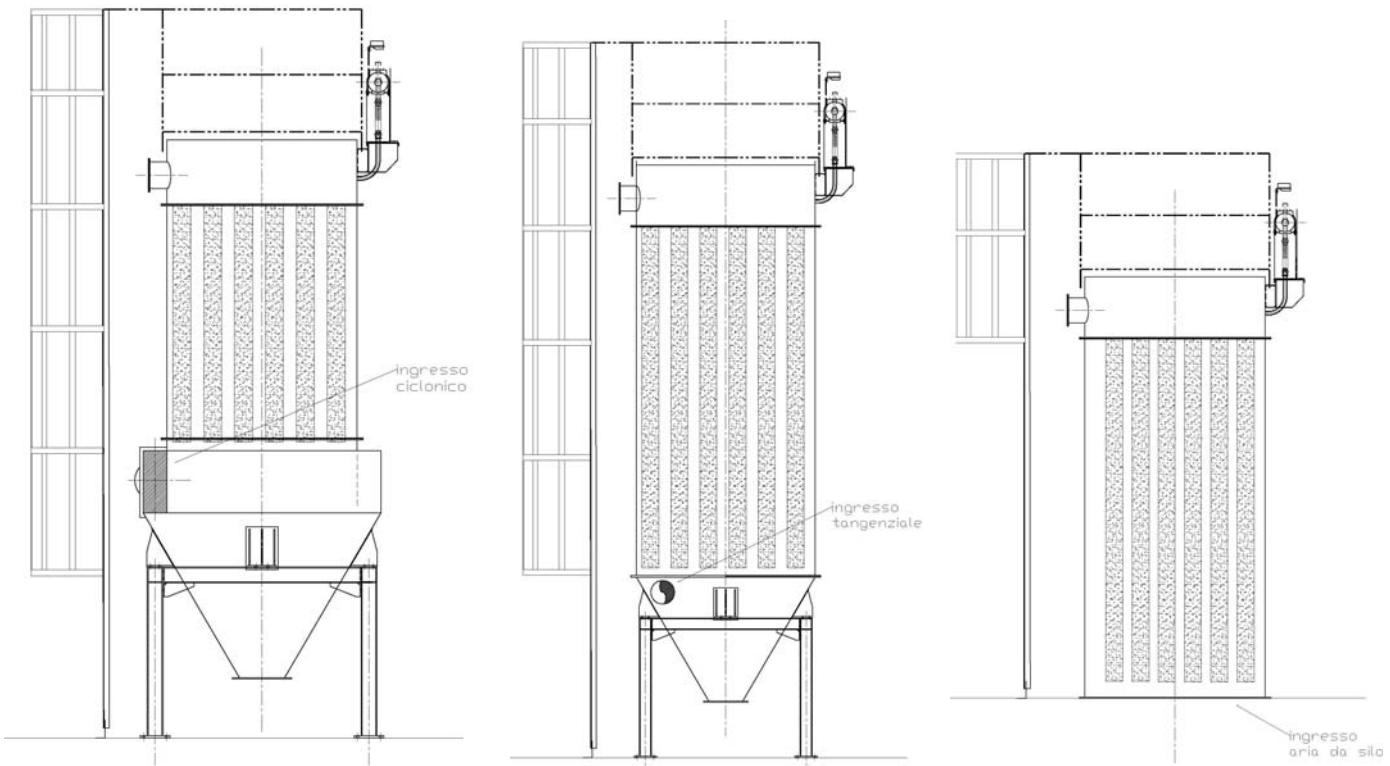
Picture 6 represents a filter with screen pre-chamber, where the dedusting process occurs thanks to a screen which keep the most coarse fraction.

Picture 7 represents a filter provided with a real pre-chamber module, where the most coarse fraction is separated by gravity.

6.2 Bag Filter Series MBCC

The filters MBCC with circular base have a completely similar operation. The only difference is the casing geometry and the type of pre-chamber that can be adopted.

In particular the types of MBCC filters with circular base are reported below:



Picture 8: Centrifugal Inlet

Picture 9: Tangential Inlet

Picture 10: Bunker Filter

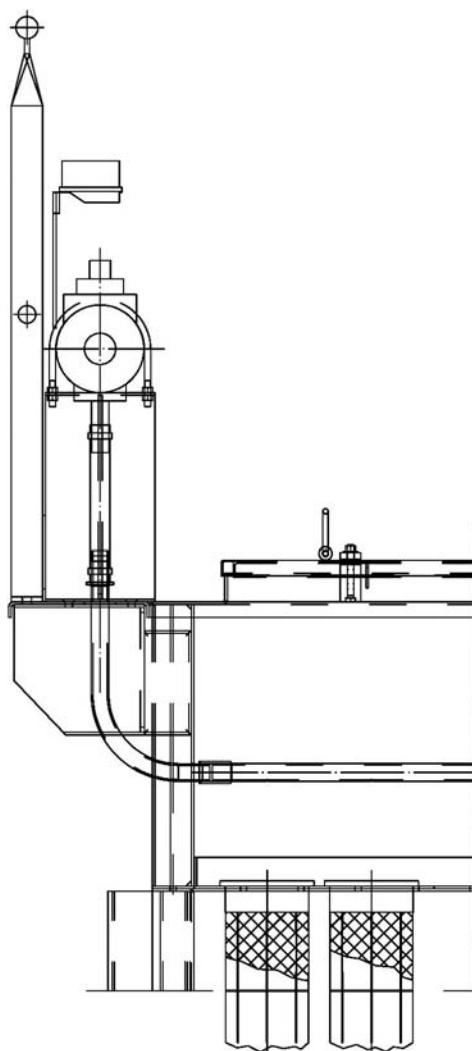
Both the filter in picture 8 with a centrifugal inlet and the filter in picture 9 with a tangential inlet use the centrifugal effect to fell the most coarse fraction of dust before the filtering unity.

In particular picture 8 (filter MBCC with centrifugal inlet) is ideal for inlet air flows with high dust concentrations, while the filter MBCC in picture 9 (with tangential inlet) is ideal for lower inlet dust loads.

Like for filters with rectangular base, picture 10 refers instead to circular filters of bunker type, ideal for dust collection in silos.

6.3 Cleaning System of Bag Filters Series MBC- MBCC

The filter upper part, required for the collection and conveyance of filtered gases, is provided with tube sheets with nozzles able to regenerate each row of bags after a certain filtering period. Each of these tube sheets is fed by a pneumatic membrane valve allowing the inlet of a considerable compressed air quantity in a split second. A counter-current blow is therefore injected at high speed and pressure into the axis of each bag. The result is a combined effect of strong shaking of the filtering medium and following counter-cleaning assuring the total removal of the dust accumulated on the bag and its drop into the hopper.



Picture 11: Sectional View of Cleaning of Filer Bags Through Cleaning Ramps

The working cycle of pneumatic valves is controlled by a series of solenoid valves actuated by an electronic control board supplied with the filter. The intervals between cleaning cycles and the duration of pulses are set thanks to timers and depend on the control system of the filter pressure drop.

6.4 Functioning principles

Bag filters can be based on two operating principles, according to the used cloth: surface and depth operation.

In surface filtration, particulates are caught by the matted surface fibres of the cloth. The mashes formed by fibres don't act, however, only as a sieve catching the particles larger than the mashes themselves, but other physical phenomena (inertial interception, direct interception, diffusion, etc.) contribute to the filtering action by allowing cloth with meshes of tens of micron to catch particles with diameter below one micron.

In depth filtration a particularly important role is played by the particles caught by the fibres, carrying out in their turn a filtering action. The deposited layer of particles contributes to the filtering operation and achieves a high efficiency even in case of very small particles. Operating conditions obviously change with the passing of time owing to the accumulation of dust around fibres.

In particular, at starting, when dust is collected only by fibres, the efficiency is low, while, after a certain operating period, efficiency increases up to very high values (99,9%). The particulate accumulation causes, however, an increase in pressure drops through the filter, therefore the filter is cleaned at regular intervals to achieve again pressure drops compatible with the flow conditions through the system.

Anyway, filtering efficiency usually increases when pressure drops through the filtering cloth increase.

In case of depth filtration, the cloth is thick and particles are caught by the cloth porosity; even in this case the dust accumulation increases performance by increasing the filtering efficiency.

One of the basic parameters of filters is the filtering speed that can be defined as ratio between the volumetric flow rate of the fluid to be treated and the available cloth surface. The most suitable filtering speed depends on the cloth type, the kind and concentration of particles, the allowable pressure drop, etc.

The filter cleaning system is extremely important for a good operation of the filter itself; when the pressure drop through the filter has reached the highest value compatible with a good operation of the system, the filter shall be cleaned. For this reason the filter is designed in sectors; during the cleaning of one sector, the others still work.

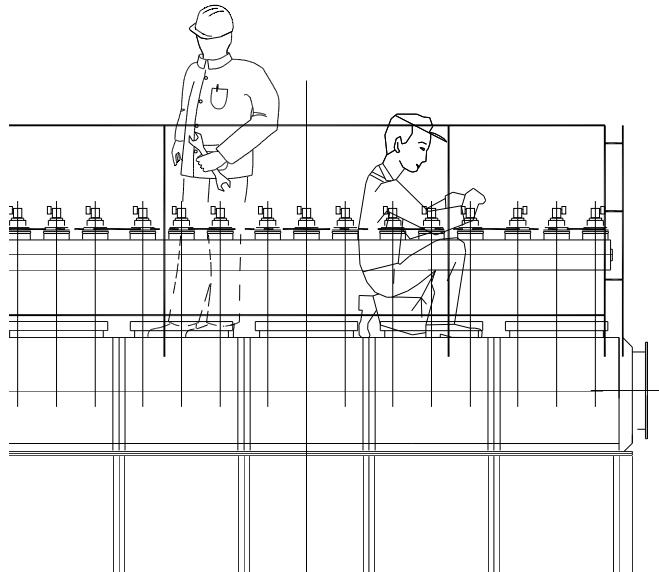
The most commonly used cleaning method is, however, the pneumatic pulse cleaning basically consisting in conveying compressed air inside bags to cause the drop of the dust previously deposited on the cloth. This method also allows the cleaning of bags with working plant.

Each bag filter series MBC is provided with cleaning ramps connected to the compressed air plant. Each ramp is connected with a row of bags. The cleaning system is controlled by an electric control board working according to the measured pressure Delta P (and therefore to the dust quantity deposited on bags). Cleaning is carried out successively on each cleaning ramp by opening the respective solenoid valve.

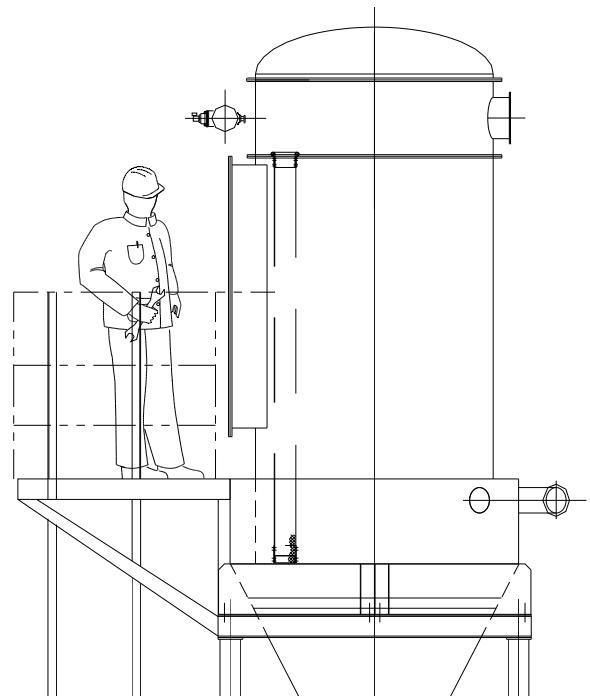
During the pause between a pulse and the following one on the same cleaning ramp, the dusty flow is intercepted by the bags, where a layer of dust deposits to be suddenly removed by the pulse and the following compressed air jet. All the dust deposited in the pause time T on the bags of each row spreads within the concerned area, and then it is collected in the hopper and is discharged by discharge devices (screw conveyors and rotary valves).

Usually inspection doors are on the top of the filter (Picture 12).

In alternative it can be putted sideways (Picture 13)

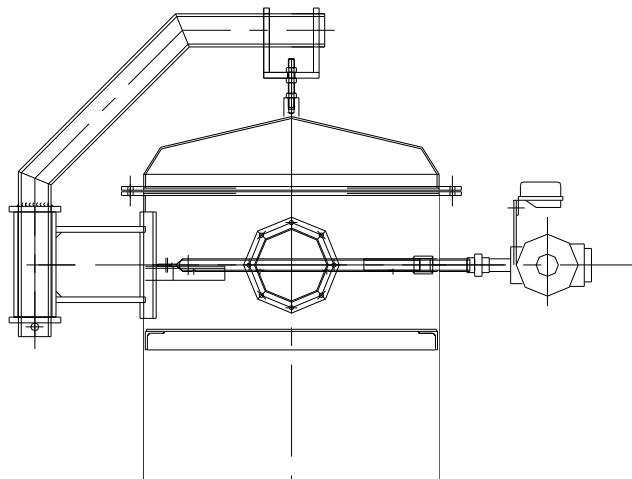


Picture 12



Picture 13

For bag filter MBCC it is possible to use only one upper door, removable with an arm called davit

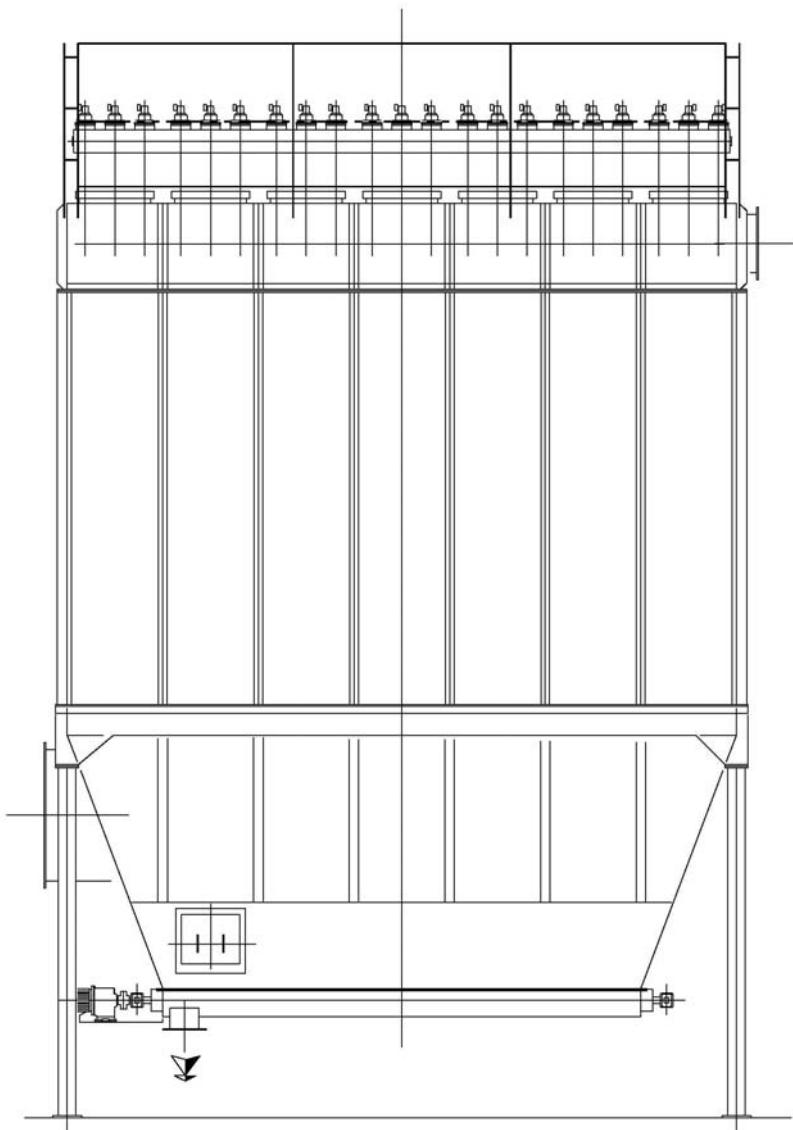


Picture 14

6.5 Dust Evacuation

Dust evacuation is carried out by a rotary valve which allows dust discharge from the hopper and prevents the air drawing in the opposite direction, towards the top. This rotary valve with high capacity, commonly called rotovalve, is suitable furnished for the area and type of application.

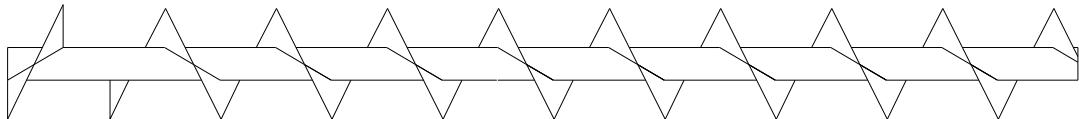
In case the filter develops especially in one direction, the dust collection and evacuation from the hopper can be carried out thanks to a screw conveyer, conveying dusts to a single discharge point.



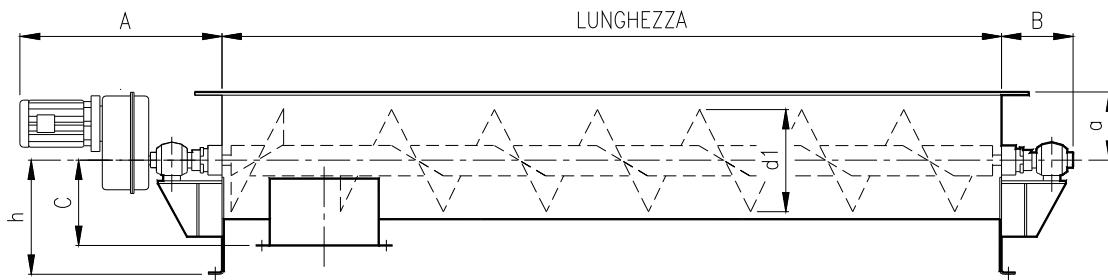
Picture 15

The Screw Conveyer (SC) essentially consists of a metal sheet duct, two lateral bolted heads and an inner shaft, where a helicoidal screw is radially welded to form a spiral (Picture 16).

The shaft is housed inside to be revolving by rolling bearings inserted into the head external supports (Picture 17).



Picture 16



Picture 17

The product loaded in the duct doesn't get in rotation because of the friction contact against the inner wall of the duct and is conveyed inside the duct in axial direction, by means of the propeller.

The loose product falls and is discharged from the outlet positioned below the duct.

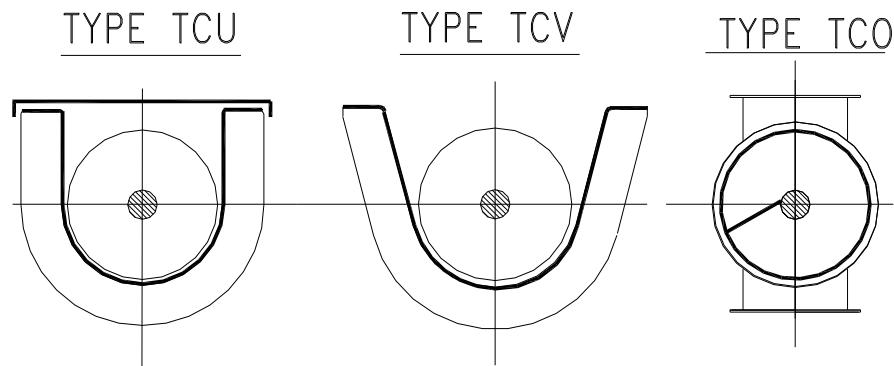
Filling occurs by force of gravity; the quantity of conveyed product essentially depends on the number of revolutions of the shaft.

SCs are used for dry and smooth flowing dusts and/or granulated materials.

SCs can be used only in a closed system and are adopted exclusively for:

- a the simple transport and discharge of product with weighted material conveyed for example by another conveyer;
- b the discharge from hopper.

Screw Conveyers Boldrocchi are produced in 3 constructive models (Picture 18) :



Picture 18

Series TCU_

- U-shaped duct, with upper closing covers
- Duct with large square inlet and outlet according to the propeller volume
- Available with round inlets and outlets according to DIN

Series TCV_

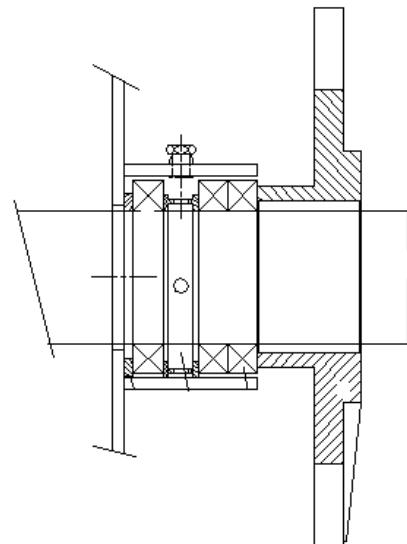
- V-shaped duct, without covers, directly flanged to the loading hopper
- Product feeding usually on the whole length
- Duct with square outlet
- Available with round outlets according to DIN

Series TCO_

- Tubular duct
- Casing with large square inlet and outlet according to the propeller volume
- Available with round outlets according to DIN

Tightness in the shaft passage towards outside is assured by an adjustable stuffing box on the rotor shaft (Picture 19).

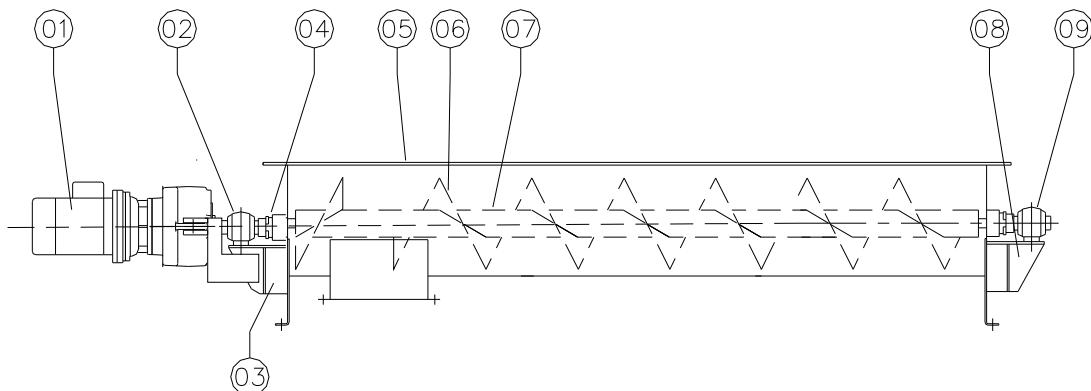
Gauged ring in PTFE,
 1 packing ring,
 a fluidification system and
 2 packing rings



Picture 19

Rolling bearings are positioned outside and require no maintenance.

Here below a short description of the housing and its components.

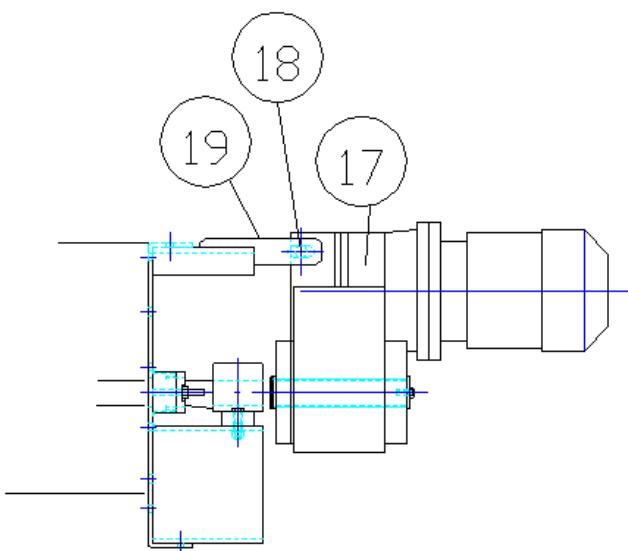


Picture 20

- 1 Pendulating gear motor
- 2 Support – Discharge side
- 3 Head on the motor side with torque arm
- 4 Shaft seal (packing and stuffing box)
- 5 Duct
- 6 Propeller
- 7 Rotating shaft
- 8 Head on duct side
- 9 Support – Duct side

The direct drive from the gear motor is described below:

Pos.	Description	Quantity
19	Torque Arm	1
18	Elastic element	1
17	Gear motor	1



Picture 21

6.5.1 Supply of the Rotation Control Sensor

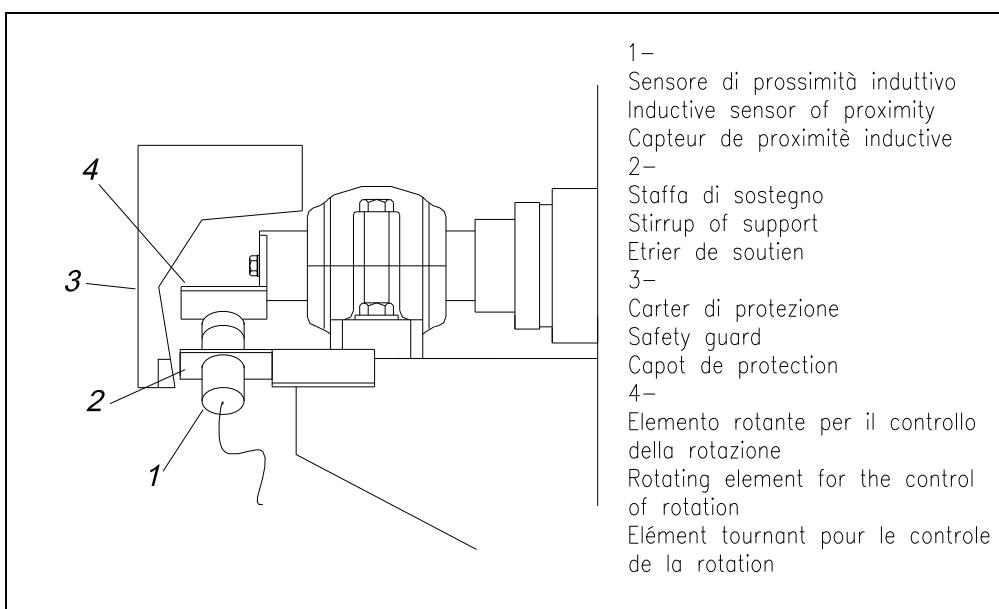
In some cases the screw conveyer can be provided with a rotation control system (see picture 22), able to signal any stops, drive failures or SC overload.

A metal drive element fastened on the rotor shaft is recognized at each rotation by an inductive proximity sensor suitable for the detection of metal objects.

An output signal is issued, corresponding to a closing or opening contact according to the adopted instrument model.

The control system of revolutions is provided with instrument guard and support.

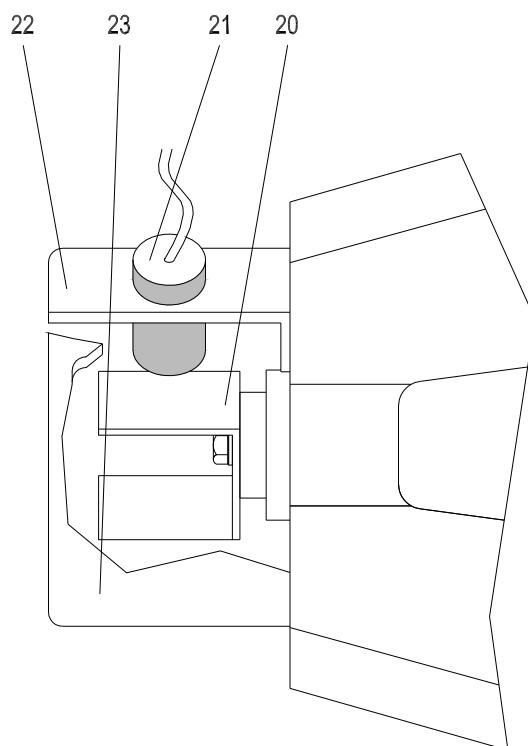
The distance between the instrument and the metal drive element ranges between 6 ÷ 10 mm



Picture 22

The control device for rotations, if any, shall be suitable for the installation area:

Pos.	Description	Quantity
20	Drive element	1
21	Inductive sensor	1
22	Sensor bracket	1
23	Safety guard	1



Picture 23

7 Positioning and Assembling Instructions

This chapter describes the characteristics of the positioning and assembling personnel and the positioning and assembling instructions of the filtering equipment.

7.1 Positioning and Assembling Personnel

Positioning and assembling operations are usually carried out by the technical personnel of BOLDROCCHI S.r.L. Division ECOLOGIA. Avoid carrying out the assembling operations of the various components (unless otherwise agreed at the order). Any damages caused by the Customer and by his personnel release the manufacturer from his responsibility and let the guarantee lapse.

In case of agreements between the manufacturer and the user, positioning and assembling operations can also be carried out by qualified **technical personnel** chosen by the customer, provided that they have carefully read this manual.

7.2 Receiving Inspection

At the receipt of the supply, visually check packages are intact and are not damaged. If everything is intact, remove packages (except in case of different instructions by Boldrocchi S.r.L. Division Ecologia), and check machines haven't been damaged during transport.

In case damages or defects are noticed:

1. In case of anomalies not to install the material;
2. Immediately notify the forwarder, by phone, as well as by written communication through registered letter with advice of delivery;
3. for their information, advise BOLDROCCHI S.r.L. Division ECOLOGIA, upon registered letter (with advice of delivery), by addressing it to:

BOLDROCCHI S.r.L. Division ECOLOGIA
Viale Trento e Trieste, 93
20046 Biassono (MI)

NOTE

THE NOTIFICATION OF ANY DAMAGE OR ANOMALY
SHALL BE PROMPTLY FORWARDED AND SHALL ANYWAY
BE RECEIVED WITHIN EIGHT DAYS AFTER THE DATE OF
RECEIPT OF THE SUPPLY

7.3 Handling of Machines

This chapter describes the requirements for handling personnel and equipment and the handling procedures of the bag filter components.

7.3.1 Personnel's Requirements and Handling Equipment

Lifting and handling operations of machines shall be carried out by skilled personnel authorized to use lifting equipment.

In order to carry out the handling and positioning of filter components, it's necessary to use suitable lifting systems that can be chosen among the ones mentioned below:

- Bridge crane;
- crane;
- fork lift truck;
- transport pallets.

ATTENTION: THE COMPANY BOLDROCCHI S.r.L. Division ECOLOGIA ACCEPTS NO RESPONSIBILITY FOR ANY DAMAGES CAUSED TO PERSONS AND/OR PROPERTY DUE TO DISREGARD OF THE EFFECTIVE SAFETY REGULATIONS CONCERNING LIFTING AND HANDLING OF MATERIALS INSIDE AND OUTSIDE THE FACTORY.

7.3.2 Packing and Shipping

Smaller components (such as: rotary valve, double-flap valves, etc ...) are palletized and protected with cellophane. Small items (such as: bolts and nuts, gaskets, filter bags, etc...) are packed in cartons for easier loading, unloading and handling operations. The components that can't be palletized (for ex. filter, screw, ducts, etc...) are directly loaded on the means of transport. During loading, compact the load as much as possible, group the single components homogeneously and make the following unloading operations as easy as possible.

The shipping of machines to the Customer is usually carried out with the following solutions:

1. road transport;
2. transport by rail;
3. transport by air;
4. transport by sea.

The choice among the different shipping systems depends on the purchaser's location and on the particular requirements of the Company BOLDROCCHI S.r.L. Division ECOLOGIA.

After delivery, materials shall be carefully handled.

To lift and to position the single machines, it's necessary to use suitable lifting systems chosen according to their weight and proceed according to the previously described points.

DANGER: LIFTING AND HANDLING OPERATIONS SHALL BE CARRIED OUT BY SKILLED PERSONNEL AUTHORIZED TO USE SUITABLE EQUIPMENT.

ATTENTION: THE COMPANY BOLDROCCHI S.r.L. Division ECOLOGIA ACCEPTS NO RESPONSIBILITY FOR ANY DAMAGES CAUSED TO PERSONS AND/OR PROPERTY DUE TO DISREGARD OF THE EFFECTIVE SAFETY REGULATIONS CONCERNING LIFTING AND HANDLING OF MATERIALS INSIDE AND OUTSIDE THE FACTORY.

7.4 Arrangement of Assembling Operations

This chapter lists the conditions to be strictly observed before assembling.

7.4.1 Working and Transit Areas

- Working areas around the plant shall be levelled.
Working and transit areas shall be compact enough to assure a safe transit of transportation and lifting means.
- Delimit working areas with coloured bands.

- Provide accident prevention notices in all working areas and make sure the assembling personnel are informed about the safety regulations on site.
- Keep working areas clean and free from packing and waste materials.

7.4.2 Materials

- Check the number and quality of all components of the plant at their arrival on site.
- Check the conformity of materials to the indications of Drawings and Technical Specifications.
- Divide materials into groups provided with position numbers and position them within range of lifting equipment.
- Divide bolts and nuts and connecting materials into groups and deposit them in a suitably protected area.
- Any damages of materials during transportation or handling on site shall be repaired before their assembling.

7.4.3 Equipment

- Make sure of the perfect functionality of general and personal assembling equipment.

7.4.4 General Remarks

This specification reports the logical sequences of assembling operations. Anyway, they can be modified according to the conditions existing on site.

Any adjustments required during the operations specified in this manual shall be carried out on site and be performed by the assembling company.

The assembling company shall provide scaffolds – equipment – transportation and lifting means in the quantity required to assure a correct carrying out of operations in compliance with the effective safety regulations. Handling shall be carried out extremely carefully by avoiding crashes that could damage the external painting of equipment/machines and/or jeopardize a correct operation.

7.5 General Safety Notes

This chapter reports general safety indications about assembling.

7.5.1 Information About Safety Assembling Techniques

Operations shall be carried out in compliance with the national accident prevention regulations and the special rules in force on site.

Anyway, we indicate the main precautions to take during the operations on site as an example, but it isn't an exhaustive list:

- Inform operators of the specific risks they are exposed to and of the essential rules for accident prevention. Demand the observance of these rules.
- Provide all operators with specific accident prevention protections according to the danger of their work.
- Make sure of the suitability of equipment and periodically check their conditions.
- Check the correct operation of all handling and lifting means and the conditions of ropes.
- Before moving any equipment/machine, make sure the used means have a suitable capacity.
- Delimit working areas with ropes or coloured bands.
- Provide all operators with safety hats, accident prevention shoes, gloves, glasses, safety belts for operators working on high gangways, leather protections for welders.
- Provide the installation site with a first aid station.
- Apply the notices with the fundamental accident prevention rules in the most visible points of the installation site.

7.6 General Welding Notes

This chapter will supply the indications for all welds. All welds shall comply with the indications in the effective regulations and/or with the requirements and agreements with site managers.

Before welding, the ends to be welded shall be carefully prepared and cleaned; during welding any possible damages due to atmospheric agents or other factors shall be avoided.

Should defects or failures be noticed during assembling, the repairing procedure shall be agreed with our site manager.

The welders used to carry out welds shall be qualified by an acknowledged Official Board. Each welder shall have a portable hand furnace for the electrodes to be preserved in a furnace, when in store.

Unless otherwise prescribed, electrodes of class 4 B UNI 5132 shall be used for carbon steels and electrodes with basic coating and physical-chemical specifications of the deposited material similar to the base material shall be used for corrosion-resistant steels EURONORM. Any different material shall be submitted to the approval of the site responsible board.

At the moment of the use, electrodes shall be in good conditions of preservation, dry and with intact coating. The use of qualified automatic or semiautomatic welding processes is allowed, provided that suitable protections against atmospheric agents are adopted.



Attention

Avoid welding near materials which could cause a fire. In particular, avoid any welding operations inside the bag filter after assembling filter bags.

7.7 General Screwing Notes

- Check the coupling surfaces of faying surfaces are carefully cleaned before assembling.
- For each coupling use the bolts indicated in drawings.
- Tightening shall start from inner bolts and alternately proceed to the external ones.
- The tightening value, see instructions CNR 10011/85, shall be checked with dynamometric spanner and be included in the tolerances ($\pm 5\%$) of prescribed values.

In the following prospectus there are the values of the resistant area A_{res} , of the normal strength N_s and of the couple of screwing T_s to be applied on the head of the various types of bolts:

d mm	A_{res} mm^2	T_s (N · m)					N_s (kN)					d mm
		4.6	5.6	6.6	8.8	10.9	4.6	5.6	6.6	8.8	10.9	
12	84	39	48	58	90	113	16	20	24	38	47	12
14	115	62	77	93	144	180	22	28	33	52	64	14
16	157	96	121	145	225	281	30	38	45	70	88	16
18	192	133	166	199	309	387	37	46	55	86	108	18
20	245	188	235	282	439	549	47	59	71	110	137	20
22	303	256	320	384	597	747	58	73	87	136	170	22
24	353	325	407	488	759	949	68	85	102	158	198	24
27	459	476	595	714	1 110	1 388	88	110	132	206	257	27
30	561	646	808	969	1 508	1 885	108	135	161	251	314	30

The allowed deviation tolerances are the following ones:

- $\pm 0.05\%$ on all flat dimensions, including intermediate and external diagonals.
- ± 3 mm. on levelling of column upper plates as to dimension “0”.
- $\pm 0.05\%$ on verticality of columns and panels of filter chambers.

7.8 Filter Mechanical Assembling

This chapter will supply the operating indications for the assembling of a bag filter. Of course, the filter type of the purchase order could deviate from the one described in this manual. The sequence of assembling operations could, therefore, deviate in the specific case, or not include all operations indicated here.

Assembling shall be carried out according to this chapter, the equipment assembly drawing and any other drawings supplied by Boldrocchi S.r.L.

The table reported below indicates the assembling sequence of the unit.

SEQUENCE	DENOMINATION
1	Loads on Foundations
2	Bag Filter Unit
3	Filter Discharge Components
4	Filter Bags and Bag Cages

7.8.1 Foundations

Carefully level the upper surfaces of bases to assure a safe bearing surface for shimming.

Carry out an altimetric and planimetric check of foundation bases.

Check the correspondence of the deviation dimensions between the centre lines of the various units of the plant.

Check anchor bolts are inserted into bases and positioned according to the directions specified in the drawing.

The upper surface of bases shall be ca. 50 mm. lower than the final height to allow shimming under supporting structures.

After positioning structures, fill pits with expanded cement.

Position suitable shims in the upper part of bases to achieve the exact assembling height. Shims shall have a stout bearing surface and be in sufficient number to assure the maximum stiffness of base plates after tightening anchor bolts.

7.8.2 Filter

The filter consists of: a hopper in the shape of a truncated pyramid, a filter casing, a plenum, a set of filtering elements, step irons, protection guards and a compressed air tank for the cleaning of filtering elements.

During assembling operations strictly observe the orientations of outlets and nozzles, as indicated in the assembly drawing.

The **hopper** can be manufactured in a single piece or in several parts. If it is manufactured in several parts, the hopper can be assembled as indicated:

- prepare on site a solid and levelled bearing surface on which the complete hopper is assembled. For the handling of components use suitable lifting equipment;
- join both parts with bolts and nuts, by interposing the provided gasket between the coupling flanges
- check the correct general squaring, by verifying diagonals, heights and dimensions of upper and lower bases;

The hopper is now complete, positioned on the ground and with the dust discharge outlet directed upwards.

Now the hopper is provided with the supporting structure complete with bracings.

Then proceed to assembling as follows:

- lift the hopper by means of a crane, position it on the prepared base and check it's levelled;
- fasten the hopper to the base by means of tie rods;
- fasten the inspection door by using the supplied bolts and nuts, by interposing the provided gasket between the coupling flange and the inspection door.

The **filter casing** can be manufactured in a single piece or in modular panels.

If it's manufactured in panels, it's necessary to assemble the filter casing, as follows:

- assemble on site the panels of the filter casing by using the supplied bolts and nuts and by interposing the provided gaskets between the various panels.

After the assembling of the filter casing or in case it's manufactured in a single piece, proceed to assembling as follows:

- lift the filter casing by means of a crane, position it on the hopper by interposing the provided gasket between the coupling flanges
- fasten the filter casing to the hopper by means of bolts and nuts;

For the **plenum** of the bag filter proceed to assembling as follows:

- if it's manufactured in several pieces, the plenum shall be assembled by using the supplied bolts and nuts and by interposing the provided gaskets between the various panels
- Then position the inner ramps for the cleaning of bags
- Fasten the provided 20x25 black mousse gasket in the sealing groove of the inspection upper doors by using adhesive silicone;
- Position the upper doors on the plenum;
- Lift the en bloc plenum by means of a crane and position it on the filter casing, by interposing a gasket between the coupling flanges and by using the provided bolts.

After lifting the bag filter from the ground, it's necessary to complete the mechanical assembling of structural works as follows:

- fasten the supporting brackets of the compressed air manifold

- Connect each outlet of the compressed air manifold to its respective cleaning ramp by using the provided couplings complete with fastening clamps (alternatively couplings in three pieces can be supplied)
- Position the step irons and the gangway and fasten them to the ground;
- Fasten the step irons to the filter;
- Fasten the **control board of the filter cleaning economizer** on the filter roof or on one of the supporting columns.

7.8.3 Filter Discharge Components

- Unpack the rotary valve and the screw, if any;
- Check their conditions;
- Lift the discharge component and position it under the outlet of the filter hopper;
- Connect the element to the hopper outlet by coupling flanges and interposing the fibre glass gasket;
- Connect the valve exhaust to the inlet of the machine receiving the product.

Anyway, refer to the enclosed specific manual for the installation of the discharge element.

7.8.4 Assembling of Filter Bags

After assembling the filter, proceed to the assembling of filter bags. Filter bags shall be carefully handled and preserved in their original packing till their use. Pay attention not to damage them with pointed, very heavy, very hot objects, with fire and/or sparks.

During assembling bags and cages, no smoking is allowed and no welding operation shall be carried out on the filter and on the connected ducts during as well as after the assembling of bags.

There are several systems to fasten bags to the tube sheet. In particular, according to the customer's requirements, Boldrocchi S.r.L. is able to offer three fastening systems:

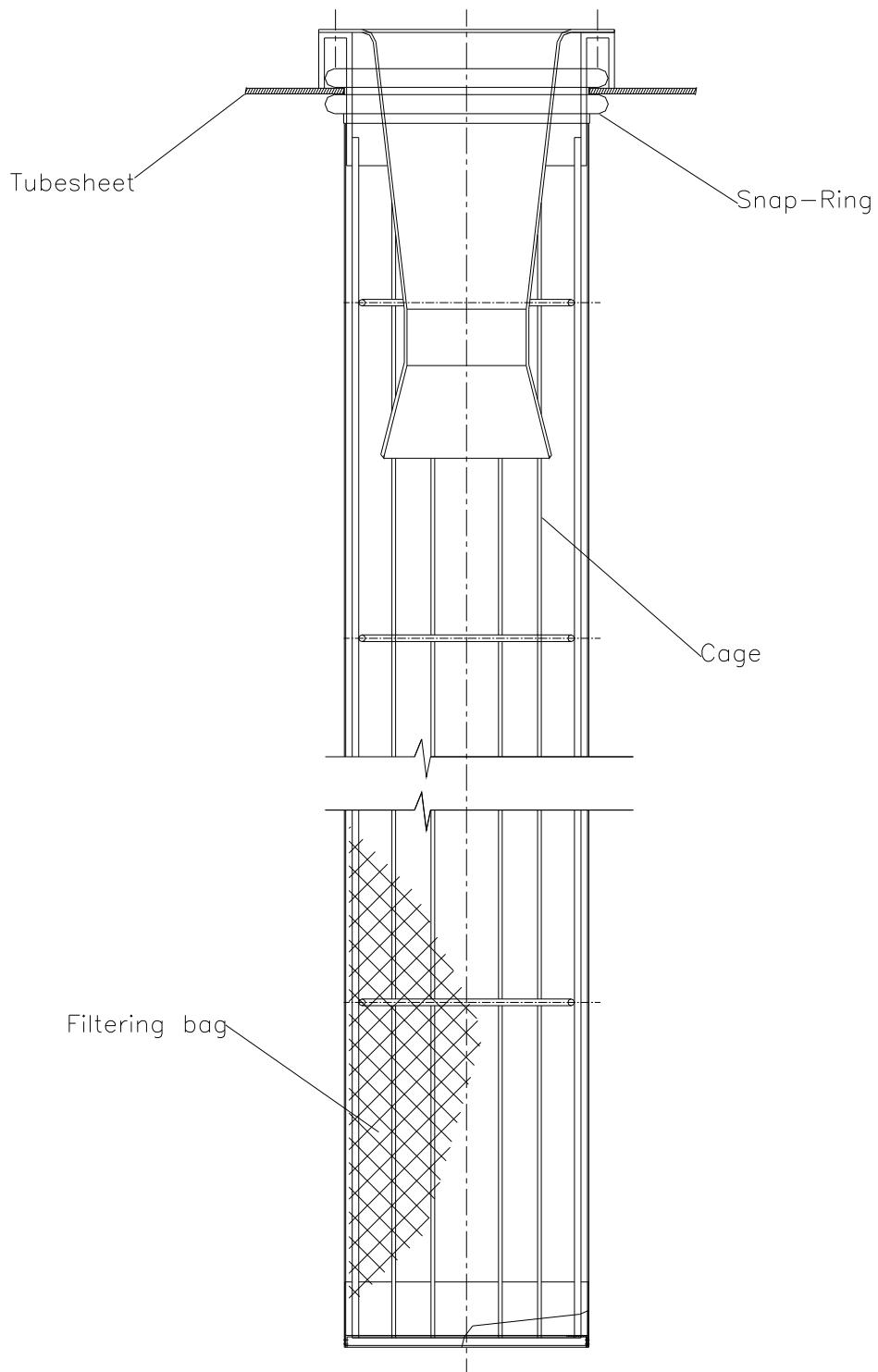
1. Snap-ring fastening with double sealing ring;
2. Trap fastening with sealing ring and fastening disk;
3. Fastening by rivets and lateral removal.

Of course, the assembling procedure is different for each system.

The fastening procedures for each type are reported below.

7.8.4.1 Snap Ring Fastening With Double Sealing Ring

In their upper part, where bags are fastened to the tube sheet, they are provided with a double sealing ring and are therefore dust-tight, while bag cages are simply lying on the tube sheet. (See picture 25)



Picture 25

For the assembling of bags keep to the following procedure:

- Check filter inlet and outlet ducts are definitively installed;
- Remove the upper access doors to the bag supporting plate;
- After opening the upper doors remove the compressed air blowing pipes inside the filter plenum, over the concerned row of bags, if they are already installed;
- Make sure there are no foreign matters on bag supporting plates or inside the filter and clean the bag supporting plate;
- Carefully check bag holes aren't damaged;
- Carefully check all welds of bag supporting plates have been carried out and are perfectly tight;
- Take one bag at a time, check it and insert it from the side of the closed bottom into the hole in the bag supporting plate, paying attention not to damage it by rubbing it against the hole edge. Lower it slowly;
- Fasten the flexible collar (SNAP-RING) of the bag to the hole in the bag supporting plate, by slightly bending the sealing ring for an easy insertion into the hole (see picture 1). Pay attention not to bend the metal ring inside the collar at sharp angles, because it could cause a permanent set;
- Lay the bag by placing the upper ring of SNAP-RING on the upper face of the bag supporting plate (part towards the PLENUM), and the lower ring of the SNAP-RING in on the lower face of the bag supporting plate (part towards the FILTER CASING);
- Check the collar perfectly adheres to the bag supporting plate, manually force the adhesion (see picture 2);
- **Check that after assembling the bag the two rings of the SNAP-RING are astride the bag supporting plate (one above and the other below), as indicated in picture 25;**
- Insert the cage after checking its conditions (no deformations, cuts, and oxidation). A damaged cage CAN'T BE USED (see picture 3);
- The cage shall be slowly and carefully inserted to avoid damages to the bag;
- Check the cage flange perfectly lies on the bag supporting plate;
- Check the bag is not too stretched;
- Repeat the sequence for all bags and cages;
- Check all bags and cages are inserted in the bag supporting plate;
- After complete assembling, check from the hopper inside that bags aren't in contact with the filter side walls. In case of contacts, it's enough to turn the cage half-turn;
- Mount or reposition blowing pipes;
- Close the plenum, reposition upper doors and check seals are in good conditions and correctly positioned to avoid the air penetration.



Photo 1



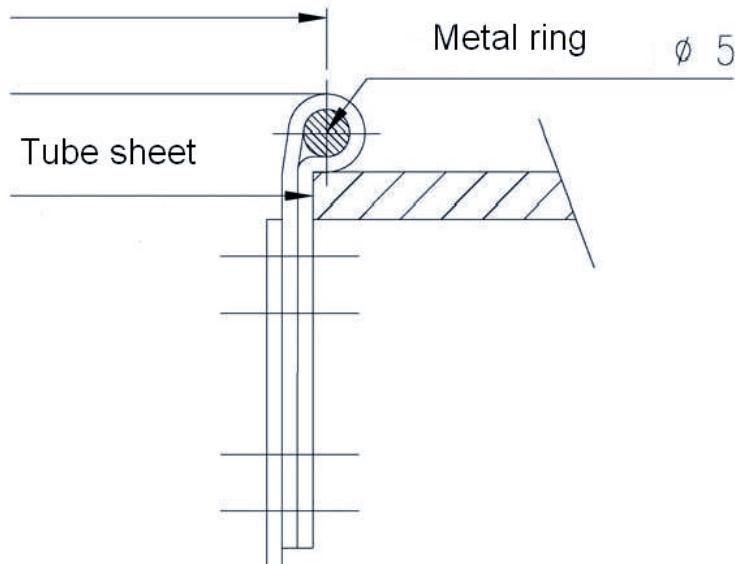
Photo 2



Photo 3

7.8.4.2 Trap Fastening With Sealing Ring and Fastening Disk

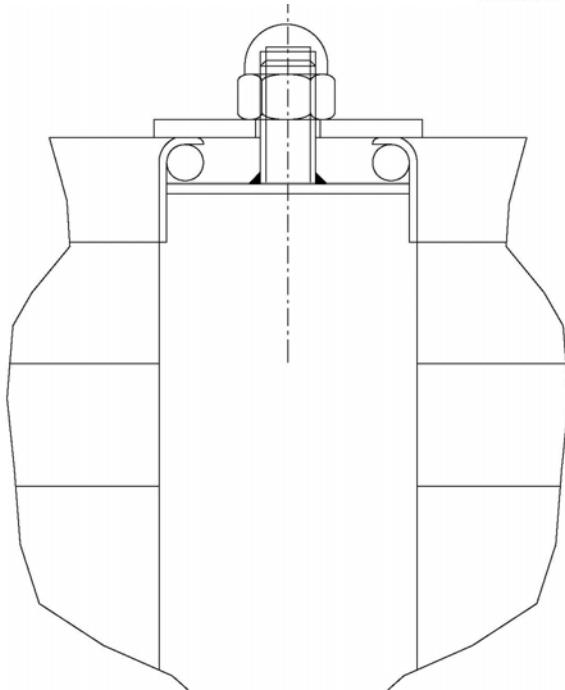
In its upper part, where it's fastened to the tube sheet, the bag is provided with a single sealing ring; the cage is provided with a side edge resting on the bag itself and is squashed on it by fastening disks. (See picture 26)



Picture 26

For the assembling of bags keep to the following procedure:

- Check filter inlet and outlet ducts are definitively installed;
- Remove the upper access doors to the bag supporting plate;
- After opening the upper doors remove the compressed air blowing pipes inside the filter plenum, over the concerned row of bags, if they are already installed;
- Make sure there are no foreign matters on bag supporting plates or inside the filter and clean the bag supporting plate;
- Carefully check bag holes aren't damaged;
- Carefully check all welds of bag supporting plates have been carried out;
- Take one bag at a time, check it and insert it from the side of the closed bottom into the hole in the bag supporting plate, paying attention not to damage it by rubbing it against the hole edge. Lower it slowly;
- Fasten the flexible collar of the bag to the hole in the bag supporting plate, by slightly bending the sealing ring for an easy insertion into the hole. Pay attention not to bend the metal ring inside the collar at sharp angles, because it could cause a permanent set;
- Lay the bag by placing the ring on the upper face of the bag supporting plate (part towards the PLENUM);
- Check the collar perfectly adheres to the bag supporting plate, manually force the adhesion;
- Insert the cage after checking its conditions (no deformations, cuts, and oxidation). A damaged cage CAN'T BE USED:
- The cage shall be slowly and carefully inserted to avoid damages to the bag;
- Check the cage flange perfectly lies on the bag supporting plate;
- Check the bag is not too stretched;
- Repeat the sequence for all bags and cages;
- Install the cage fastening disks and evenly tighten closing bolts to assure the tightness between tube sheet and bag and between bag and cage (see picture 27).



Picture 27

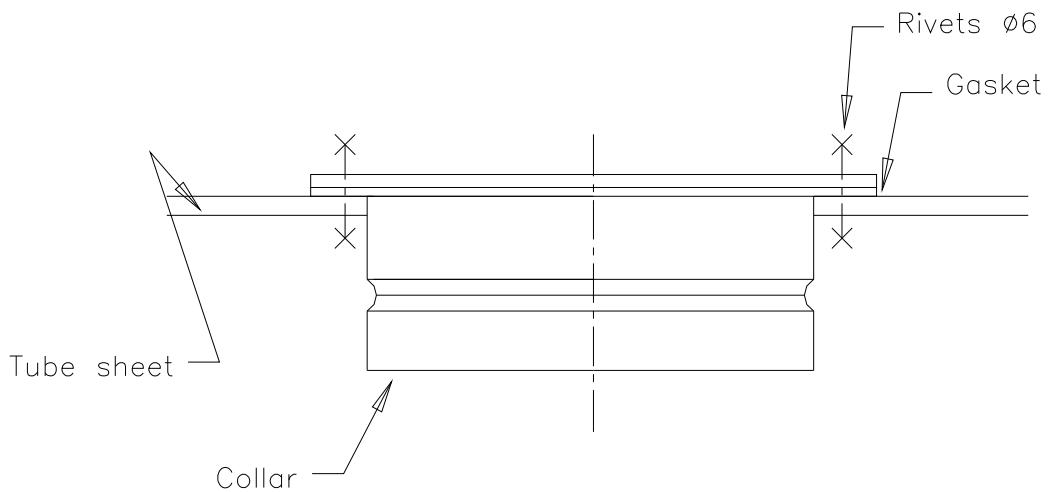
- Check the correct verticality of cages;
- Check all bags and cages are inserted into the bag supporting plate;
- After complete assembling, check from the hopper inside that bags aren't in contact with the filter side walls. In case of contacts, it's enough to turn the cage half-turn;
- Mount or reposition and fasten blowing pipes;
- Close the plenum, reposition upper doors and check seals are in good conditions and correctly positioned to avoid the air penetration.

7.8.4.3 Fastening With Rivets and Lateral Removal

This fastening procedure is used for layout requirements, especially when there is no sufficient available height to remove bags through upper doors; the bag filter is therefore provided with side doors to remove bags; in this fastening type an upper collar provided with venturi tube is definitively fastened to the tube sheet; the cage is hooked to the upper collar and the bag is inserted on the cage; the bag can be laterally removed.

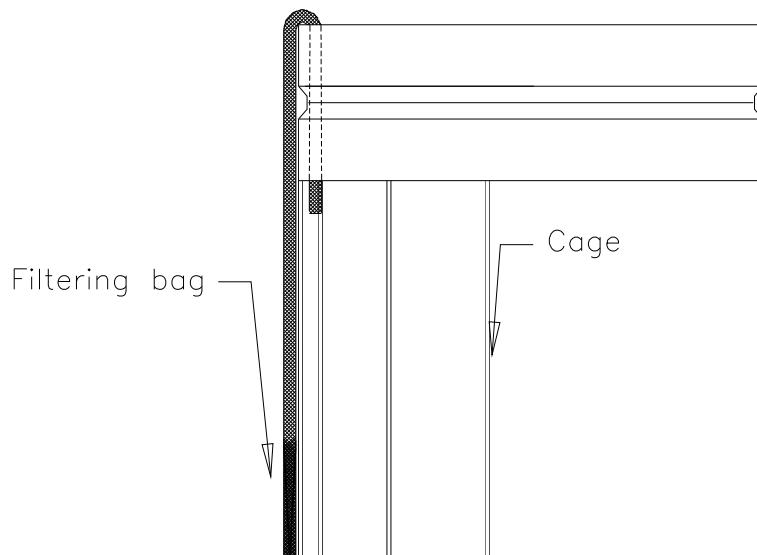
To proceed to the assembling of bags and cages, keep to the following procedure:

- Fasten by rivets the upper collar of the cage and the Venturi tube to the tube sheet by assuring tightness through silicone or suitable gaskets (picture 28);



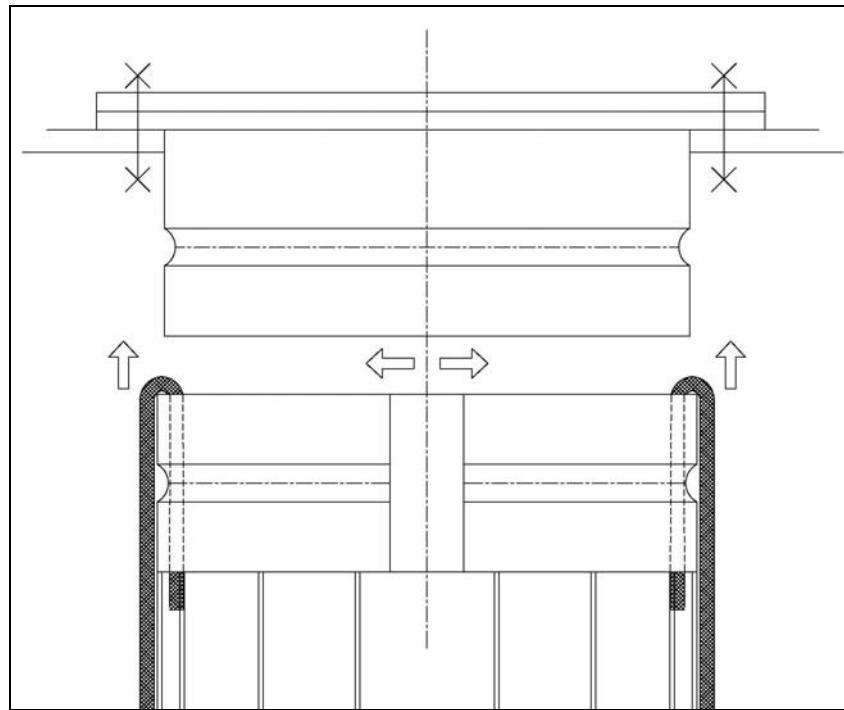
Picture 28

- Take one bag at a time and check it, insert the cage into the filter bag, leaving 50 mm of bag exceeding inside the cage to assure dust tightness (picture 29);



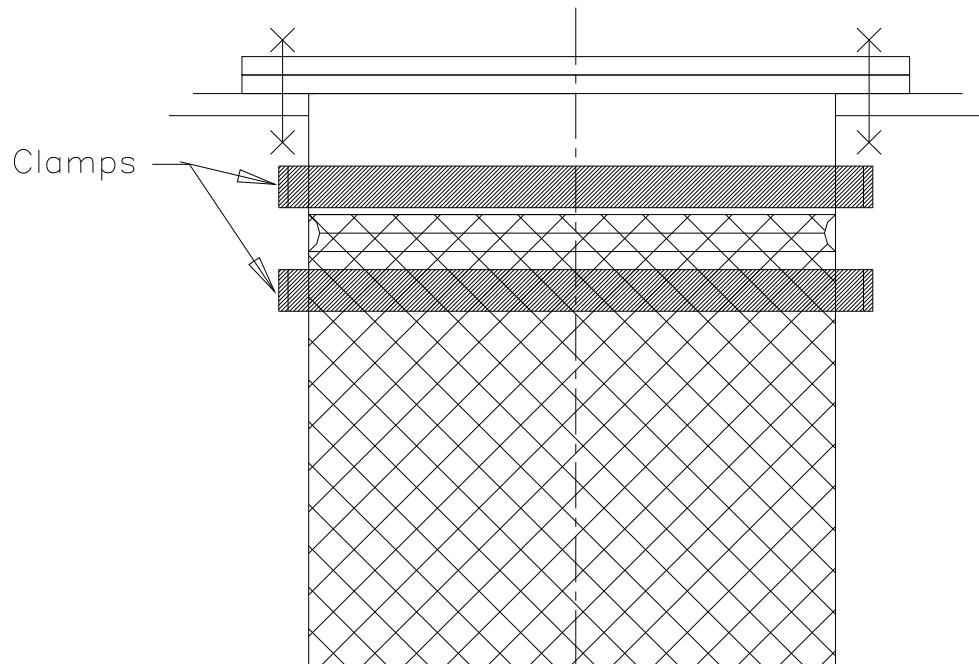
Picture 29

- Install the cage through the inspection door in the filter central casing and hook it to the upper collar (picture 30);



Picture 30

- Close the bag on the cage with two clamps (picture 31);



Picture 31

7.9 Equipment Earthing Connections

This paragraph describes the typical earthing components used for plants on metallic structure systems used to guarantee the unipotential connection of the whole equipment.

To make reference to the norm 61241-0 and to the instructions of the single components. To verify therefore the equipment earthing connection of the plant

7.10 Plant Electrical Connection

The Customer shall provide an electric supply plant with the following characteristics:

- Three-phase input + neutral wire;
- Line voltage 400 V at 50 Hz or similar;
- Supply voltage stability, variations shall not exceed 10% of the rated voltage to avoid damages to electric equipment;
- Earthing plant;
- Disconnector with suitably dimensioned fuses to insulate each single machine from the rest of the plant, if required (although a main switch is installed in the machine);
- A supply cable for each phase, with section not below 2.5 mm².

All the connections must be realize according to the Directive Cars and all the other norms in the country of installation.

Machines are connected to the electric supply plant by inserting the supply cables into the electric equipment control box. Connect the three phase wires R, S, T and the neutral wire to the inlet terminal. Of course, during this operation on supply cables there shall be no voltage between phases: operate then the disconnector before the electric equipment control box.

After the electric connection, check drive elements are rotating in the correct direction. For this check position the main switch on "ON" and press the push buttons "RESET" and "OPERATION" to give voltage to the line. Should machine elements rotate in the opposite direction, position the main switch on "OFF" again, turn off the power thorough the disconnector and invert two of the three phases of the line connection, then repeat control operations.

ATTENTION

Don't carry out these operations on pre-wired units

7.11 Plant Pneumatic Connection

The plant is designed for the operation with compressed air at 5÷6 bar.

Premise

The consumption and flow rate are usually indicated in the same unit of measurement (Normal-Litre per minute or Normal- cubic meter per hour), but they represent two different parameters:

<i>Consumption:</i>	It's the compressed air quantity required for the pneumatic components of the plant to carry out their function in a working cycle. This value depends on the number of pneumatic components, on their dimension and on the required feeding pressure. The compressed air feeding plant shall include a tank to meet the irregular requirements of compressed air and suitably dimensioned connecting pipes between tank and component.
<i>Flow Rate:</i>	It's the capacity of a feeding line to meet momentary consumption peaks by avoiding sudden pressure drops. The flow rate considerably decreases, if feeding pipes with small diameter and/or excessive length are used.

The user shall provide a suitably dimensioned feeding plant for compressed air on the grounds of the above mentioned remarks.

Connect feeding pipes to the couplings installed on the machines using compressed air and consider that the operating pressure is 5÷6 bar.

NOTE

For a correct operation of all pneumatic equipment, the compressed air fed to the single machines shall be suitably filtered, regulated and stabilized at the correct value of pressure and humidity.

7.12 Starting Procedure

Once the installation of the equipment is completed and before carrying out the operating tests, the following checks shall be performed:

- Check of fastening by casting of anchor bolts;
- Check of flatness and levels of structures and machines;
- Check of tightening of anchor bolts;
- Check of thorough tightening of bolts on the various machines (For example for bag filter: fastening with supporting structure, etc);
- Check there are gaskets between all flanges;
- Check the tightening of bolts on pipes, brackets, flanges, locks etc;
- Check the correct assembling of service stairs and all banisters;
- Check the correct assembling of expansion joints;
- Check the correct installation, connection and input of all instruments;
- Check the electric connections of boards and their connection to each installed equipment;
- Check the connection of compressed air to each installed equipment;
- Check the perfect external tightness of the filter casing to avoid unwanted infiltrations of meteoric water;
- Check the inner tightness between dust side (dirty side) and dusted air side (clean side);
- Check the installation of the various inspection doors on the equipment and/or machines and the application of sealing gaskets;
- Check that inside hoppers, filter plenums and various machine parts (rotary cells, screws, etc.) there are no foreign matters, such as: rags, cardboards, plastic sheets, wooden pieces, electrode residuals, bolts and anything else that, if sucked, could cause damages to the equipment;
- Check the cleaning of compressed air lines by blowing, by opening the circuit at one end;
- Check that all electric motors are connected and powered and the line voltage complies with the one indicated in the rating plate on the motor;
- Check the unipotential connections of the large metal masses and earthing connections

After carrying out the above mentioned checks and before starting the plant, the following checks shall be performed:

- Check the reducers/variators are provided with the prescribed lubricant;
- Check the first manual greasing of the components requiring it (bearings etc.);
- Check that all air compressed lines are fed with their respective fluids at the correct pressure values;
- Check the opening/closing of the manually controlled slide valves, if any;
- Check the correct cyclic operation of the compressed air counter cleaning system of the filter;
- Check the direction of rotation of all electric motors;
- Carefully check the loadless operation of the screw conveyor for about an hour, paying particular attention to any possible noise, overheating of bearings and control elements, perfect tightening of supports/control elements and protection devices;
- Check the operation of rotation sensors (control of rotations);

Regularly check that all the alarms and cycles work correctly, according to the functioning logic. If there isn't a dedicated functioning logic, consult the functioning logic described in this manual, paragraph 9.3.

Attention: Once checked there are no malfunctions and, if necessary, removed them, let the equipment run and keep under control:

- Absorbed current;
- Motor/reducer-variator temperature;
- Temperature of bearings;
- Mechanic vibrations and noise.

7.13 Electric Connection Removal

Through the disconnector before the electric connection of the plant with the live line, insulate the plant and/or the single machine from the electric supply line. After checking there is no more tension in the line, remove the electric connection from the inlet terminal box and remove the three phase wires R, S, T, and the neutral wire of the supply cable to be withdrawn from the machine side.

7.14 Pneumatic Connection Removal

Through the on-off valves insulate the plant and/or the single machine from the compressed air feeding pipe. Exhaust the compressed air remained between the on-off valve and the machine to be disconnected and then proceed to disconnect the compressed air pipes.

8 Filter Prescribed Use

The filtering equipment has been designed for the dust collection in the sucked air.

Dust suction is assured by a centrifugal fan.

The dust caught inside the filtering unit is discharged through a motor-driven on-off valve installed under the hopper.

To locate the components of the filtering equipment, refer to the drawings enclosed to this manual.

8.1 Safety

8.1.1 Definitions

<i>Danger:</i>	source of possible lesions or damages to the health (UNI EN ISO 12100/1).
<i>Dangerous Area:</i>	any area inside and/or near a machine where a person is exposed to risks of lesions or damages to the health (UNI EN ISO 12100/1, D.L. 81/2008).
<i>Working Equipment:</i>	any machine, equipment, tool or plant designed to be used during operation (D.L. 81/2008).

8.1.2 Authorized Personnel

The filtering equipment doesn't consist of machines designed for professional use; no specific professional qualification of operators is required, but they shall be instructed about filter use and emergency operations. Moreover, the operator shall view this manual to be informed of the filter operation and the working safety conditions.

The same precautions shall be applied to the maintenance personnel as well.

Unauthorized persons can't near or climb onto the plant during its use or maintenance. During the plant maintenance all possible safety rules, precautions and instructions shall be applied.

Maintenance personnel shall avoid damages to other persons.

8.1.3 Preventive Behaviour Directions

- Don't carry out any operations on operating machines.
- Don't near dangerous areas without stopping machines and making sure they are really standstill.
- Always ask for assistance during the operations inside the plant.
- Follow safety procedures and always use the provided safety equipment.
- Always use personal safety devices and approved instrumentation.
- Climb onto the filter only by using the provided step irons.
- At the end of every maintenance operation the operator shall make sure all safety protections and devices have been correctly reset.
- **The Company BOLDROCCHI S.r.L. Division ECOLOGIA accepts no responsibility for any accidents or damages caused to persons and/or property due to disregard of the safety directions and regulations of this manual;**
- **These directions, together with the regulations about the filter installation and the electric connection, are, on the other hand, integral part of the Accident Prevention Industrial Regulations of each single country;**
- **THESE SAFETY DIRECTIONS COMPLETE AND DON'T REPLACE THE LOCAL EFFECTIVE SAFETY STANDARDS OPERATORS SHALL KNOW;**
- **NEVER carry out hurried or makeshift repairs that could jeopardize a correct operation of the filter;**

- **IN CASE OF DOUBT ALWAYS ASK FOR THE INTERVENTION OF QUALIFIED PERSONNEL;**
- **ANY INFRINGEMENT BY THE PURCHASER RELEASES THE MANUFACTURER FROM EVERY RESPONSIBILITY AND THE PURCHASER BECOMES THE ONLY RESPONSIBLE TOWARDS THE COMPETENT AUTHORITIES FOR ACCIDENT PREVENTION.**

8.1.4 Safety Devices and Prevention Directions

This section reports some basic safety directions to be strictly followed by the use and maintenance personnel to avoid accidents to operators and serious damages to the plant.

The company Boldrocchi S.r.L. can't foresee all circumstances that can be a potential danger during the use and maintenance of the filtering plant. For this reason, the safety warnings included in this manual and repeated through notices applied to the plant machines can't provide for all precautions to adopt for accident prevention.

8.1.5 Features of Safety Devices

MACHINES AND EQUIPMENT

All moving mechanical parts are protected.

The shaft of the cochlea driving reduction gear and the gearings are enclosed in a protection carter, preventing the direct contact with moving parts.

The worm screw for the dust conveyance rotates inside the scroll and isn't easily accessible.

All inspection doors of the plant aren't easily removable because they are fastened with bolts.

The oil-dynamic and pneumatic pistons of the dust compacter are protected by grates preventing an easy access to dangerous moving parts.

In case of high operating temperatures, the plant is provided with insulation and warning boards to protect operators against possible burns.

- Make sure all protection panels and cases are correctly installed; if they are damaged, repair or replace them.
- Don't remove protection panels when the electric circuit is live or motors are running.
- Always use warning boards when any maintenance operation is being carried out.
- Never remove safety devices. Periodically check their correct operation and efficiency.
- Don't halt near the filter side rupture disks as vent surfaces could endanger the personnel's safety.

ELECTRICITY

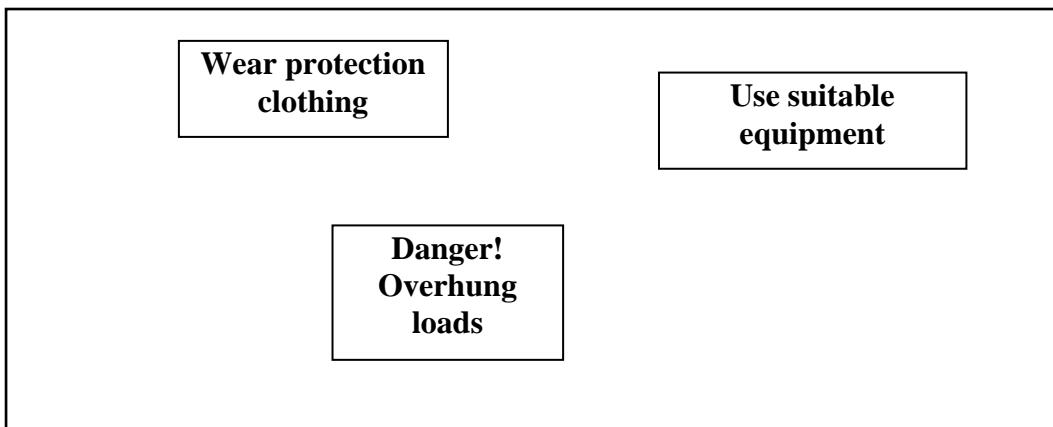
The electric installation is suitable for the characteristics of rooms.

NOISE

The equivalent noise level is always maintained below the limits prescribed by standards and contract conditions.

8.1.6 Machine Tools

- Always follow the instructions indicated in the maintenance manual without taking personal initiatives.
- Observe prohibitions and always take the precautions indicated in the notices placed in dangerous areas.



- Don't remove the protections and safety devices of machines.
- Don't clean or grease machine moving elements, unless necessary for particular technical requirements: in that case use suitable means to avoid any danger.
- No operation on moving components is allowed.
- All maintenance operations of machines shall be carried out after turning off the main switch in order to turn off the power in all electrically fed elements.
- Before starting any operation always check the adequacy and efficiency of the safety protections and devices of the machine.
- Don't try to stop or slow down moving elements with the hands or other makeshift means.
- Don't stop or anyway remove the safety devices installed in single machines, if any.
- Never remove the inspection doors of the plant, unless it has been previously stopped.
- Carry out maintenance operations on the pneumatic plant, only after blowing off the compressed air line.

8.1.7 Electric Machines and Plants

- Never take the initiative to repair malfunctions in machines, plants and electric equipment, unless it falls within one's competence.
- Always notify all noticed damages as well as other anomalous situations, such as unattended cut-off cables, detective plugs, cables positioned near heat sources or rotating machine parts or dipped into water or other fluids.
- Unauthorized persons are not allowed in areas with high tension lines and plants.



Turn off the power before carrying out any operation

- Always ask for the repair or replacement of defective, worn or anyway dangerous electric equipment or parts.
- Indicate the high tension danger in the plant control boards.
- Don't carry out operations on live electric installations.

8.1.8 Unauthorized Modifications

- Don't carry out modifications to the plant or its components without the written authorization of Boldrocchi S.r.L.. Any unauthorized modification could determine dangerous situations, since some safety devices, provided in the design, may have been removed.
- Boldrocchi S.r.L. don't consider themselves responsible for any damage caused to persons or property due to unauthorized modifications.

8.1.9 Protection Clothing And Equipment

- Don't wear uncomfortable and long clothing, rings or wrist-watches; don't go with long hair near rotating or moving parts that could drag into the machine and cause serious damages to the person.
- During maintenance operations, wear antiskid shoes, ear plugs or ear protections.
- Wear suitable protection gloves; don't use rubber gloves near heat sources.
- During cleaning operations, and particularly during dust removal, wear suitable clothing and use only ATEX vacuum cleaners, if possible; if the cleaning activity requires the use of compressed air, also wear face protection or protection glasses. Anyway, always use the clothing and equipment prescribed by prevention standards of the country where the plant is installed.

8.1.10 Precautions in the use of compressed air

- Don't leave pipes connected to the compressed air source when one of their ends is free.
- Don't direct the compressed air flow against people: the air jet could cause serious damages.
- Don't remove the couplings of the compressed air line.

8.1.11 Precautions in Maintenance Operations

- All routine maintenance and general lubrication operations shall be carried out with standstill plant and after turning off the power.
- Maintenance operations shall be carried out only by authorized and qualified personnel that has attended a training course and is well acquainted with the use and maintenance procedures described in the use and maintenance manual.
- Maintenance personnel shall apply all necessary health precautions and all the procedures described for each operation. During maintenance operations, the personnel shall make sure that each assisting person shall adopt all required safety measures.
- After each maintenance operation it's necessary to write a report about the performed operations, describing possible damages and their causes and listing the replaced parts.
- Use only adequate and high quality and suitably insulated instrumentation.
- Don't use damaged or not working instruments.

8.1.12 Fire Prevention

- Don't smoke near the plant.
- Check extinguishers are full and operating and have been maintained.
- The plant responsible shall ascertain that the plant user or maintenance operator has been adequately trained about fire procedures.
- Make sure the telephone number of the fire brigade is indicated and clearly visible near the plant.
- Remove flammable materials from the area.

8.1.13 Burn Prevention

- Always wear gloves during the operations in the plant to remove the cause of a malfunction.
- Pay particular attention to plant panels where the temperature is normally high.

8.1.14 Dust Prevention

- During the filter cleaning and the removal of bags, wear protection gloves and certified respirators.
- Use only vacuum cleaners to clean the filter and surrounding areas.
- Maintain a sufficient aeration during cleaning.

8.1.15 Fall Prevention

- Use approved and authorized step irons to mount outside the plant.
- Wear non-skid shoes.
- Don't leave materials near the plant except for the time required for maintenance operations.
- Don't remove protection screens to avoid getting entangled in moving or rotating parts.
- Keep working areas clean at the end of each operation; in particular, ways of access and escape shall be kept completely clear.

8.1.16 Noise Prevention

- Use ear plugs or ear protections; pay particular attention when stopping near the fan, since vibrations and acoustic pressure can represent a potential danger.

8.1.17 Electric Shock Prevention

- Not adequately insulated or protected electric contacts can be a lethal danger.
- Only responsible personnel and qualified electricians are authorized to carry out operations on electric systems or components.
- When possible, it's advisable to remove fuses and preserve them separately to assure the disconnection of power systems.
- Control and measuring operations shall be carried out only with suitably insulated instrumentation and protection devices.

8.1.18 Welding Operations

- Don't carry out torch and electric welding inside insufficiently ventilated rooms and containers.
- During torch welding, the working place (where welding is carried out) shall be far enough from bottles.
- Before starting welding, it's absolutely necessary to check the efficiency of the various equipment components and to make sure the gas feeding pipes for torch welding and the electric supply cable for arc welding are correctly laid to avoid damages.
- Each cleaning operation or any other operation on the torch shall be carried out by stopping the gas flow.
- During welding operations check there are no dangerous materials, such as solvents, near the working place.
- Always use protective clothing.
- Carry out no welding on the already assembled filter casing or near the filter or the incoming pipes into the already assembled filter.



Attention

Avoid welding near materials that could ignite a fire. In particular avoid any welding operation inside the bag filter, after assembling filter bags.

8.2 Use Environment

The filtering equipment can operate in various environmental conditions, but always within specific limits, such as: temperature, pressure, ambient humidity. The imposed limits to the paragraph 3.5 are worth; following we expose other prescriptions regarding the environment of use.

8.3 Operating Logic

Bag filters series MBC are equipment designed for the dust collection of air flows containing potentially explosive dust traces. The design of the dust collection plant and in particular of its operating logic shall consider some measures that are absolutely necessary in case of potentially explosive atmospheres.

The bag cleaning system is managed only by means of controls in the filter control board.

The cleaning of the filtering cloth is pulse-jet.

The filter is provided with a compressed air manifold with a certain number of solenoid valves allowing, after a signal from a sequencer, a cleaning of filter bags through a counter-current jet of compressed air.

The programming and control features of the sequencer are indicated in the manuals enclosed to this equipment.

The sequencer completes the action of the inner differential pressure switch for the control of the filter delta P and is contained in a tight box provided with a front opening to allow a direct reading of the delta P on site.

The filter cleaning sequence is controlled by the control board according to the set delta P.

An on-off ball valve of the feeding air is installed before each manifold. This shall be closed in case of maintenance.

During the plant operation, the fan, the screw conveyor and any other dust discharge components shall be working.

The electric control board shall signal any malfunctions of the electric control motors of the centrifugal fan and discharge components.

In case of a stop of the electric control motor of the screw conveyer, the suction plant shall be immediately stopped.

When the plant is stopped, to avoid residual dust on the filtering material at the end of an operating cycle, the filter cleaning system automatically starts a certain number of cleaning cycles to remove any dust traces inside. Evacuation components shall be working for a period of time to assure the total evacuation of residual dust.

We'll give here some information about the operating logic of a typical dust collection plant.

A dust collection plant usually consists of:

- Bag filter for the fumes dust collection;
- Dust evacuation system consisting of a dust collection screw (if any) under the hopper, a rotary valve and a discharge screw conveyer.
- Suction fan.
- Inlet and outlet pipes (polluted/clean air areas);
- Chimney for the emissions into atmosphere.

Each dust suction and collection plant with dry dust collecting filters is controller by a control system designed and manufactured by the customer.

The only control component supplied by Boldrocchi is usually the electronic sequencer (provided with filter Delta-Pi reader) for the management of the automatic cleaning of the dry dust collecting filters.

This technical specification describes the interlocking devices and the particular functional aspects of the machines supplied by Boldrocchi, while it doesn't describe all the general aspects, such as for example the control of alarms, the manual control of motors, the display mode of the equipment on the system video

pages, the recording and historical trends of analogical measuring, etc.; for all these general aspects the customer is supposed to manage the plant by Boldrocchi like the other installed equipment.
 The machines supplied by Boldrocchi can be divided into functional groups which can have their own control logics.

The functional groups (valid for each system) described below are the following ones:

- Compressed air cleaning system for the bag filter
- Dust evacuation and discharge system from a bag filter.

8.3.1 Logic of the Cleaning System of a Bag Filter

System Elements/Components:

Each bag filter consists of a single filtering cell consisting of:

- ✓ Compressed air tanks provided with solenoid valves for bag cleaning.
- ✓ Cloth filtering bags and supporting cages.

General Notes About the Control Logics of the Functional Group:

The cleaning system for filtering bags shall ensure to carry out at least 7/10 cleaning operations/hour

Control Logics:

The functional group of the cleaning system for the bag filter shall control the cleaning of bags.

The functional group of filter cleaning, suitably parameterized with the correct settings, is autonomously able to control the clearing of filtering bags without external inputs, by automatically controlling the pressure drop in bags and therefore by maintaining a constant clogging degree of the filter.

The bag cleaning system can be carried out with two modes: *MANUAL mode* or *AUTOMATIC mode*. The choice between these two modes is at the operator's discretion. After inserting the characteristic parameters of the filter cleaning system, as described later, the operator will have at his disposal two pushbuttons START/STOP of the sequence, to start/stop the bag cleaning. These two modes have the following meanings:

- **Manual mode:** The Manual operating mode will start the sequence of the cleaning system without considering the filter delta-pi and the sequence will stop only after the stop control
- **Automatic mode:** The Automatic operating mode starts the cleaning sequence only when the filter delta-pi exceeds the DPSH value (see point 1) and it stops the cleaning sequence only when the filter delta-pi drops below the DPSL value (see point 2). This operating mode aims at an optimized filter cleaning without an unnecessary consumption of compressed air. When an automatic cleaning cycle is running and stops owing to a low Delta-Pi (DPSL intervention), when the clogging degree starts the cycle again (DPSH intervention), it will start from the row of bags after the one where it had stopped.

Functional Parameters of Automatic or Manual Modes

The operation of the bag filter, as a whole, depends therefore on a series of settable parameters, as described below:

- 1) Setting of the cleaning **Delta-Pi starting value** called **DPSH**. This value can be set from 0 up to 500mmH₂O. The recommended value is **120mmH₂O**.
- 2) Setting of the cleaning **Delta-Pi stopping value** called **DPSL**. This value can be set from 0 up to 500mmH₂O. The recommended value is **110mmH₂O**.
- 3) Setting of the cleaning **Delta-Pi alarm value** called **DPSHH**. This value can be set from 0 up to 500mmH₂O. The recommended value is **180mmH₂O**. This threshold only produces an alarm; it doesn't affect the filter operation in any way.
- 4) Setting of the **Pause Time**. This value is the time between the excitation of a bag cleaning solenoid valve and the following one (On-Line as well as Off-Line). This value can be set from 3 up to 60 sec. The recommended value is **8 sec**.
- 5) Setting of the **Operating Time**. This value is the period of the excitation of the filter cleaning solenoid valves. This value can be set from 30 up to 1000 m/sec. The recommended value is **150 msec**.

Setting of the Number of Final Cleanings After the Fan Stop

This function is very important to allow a shut-down of the plant with “clean” filter, ready for the following operation.

With standstill suction fan the cleaning system is much more efficient and allows a particularly thorough filter cleaning from the dust settled on bags. This signal shall be automatically activated only after the stop of fans after a period of plant operation (after the plant stop) and not with standstill fans (before the plant start). This value can be set from 0 to 6 cycles. The advised value is **3 cycles**. If fans are stopped during the filter cleaning sequence (for ex. during the plant stop sequence), the sequence is stopped and the final cleaning sequence is started from the first solenoid valve to the last solenoid valve for the number of cycles preset by the operator. Of course, during the “final cleaning” the cleaning system can’t depend on the filter Delta-Pi. When fans are standstill, the filter delta-pi will have a value of 0 mmH2O that shan’t anyway prevent the carrying out of bag cleaning.

It’s important to remind that, in case three final cleaning cycles are set and if the pause time is set at 6 sec. as advised, after the fan stop the cleaning system would be still working for further 20 minutes. During this final cleaning it’s important that the dust evacuation and discharge systems are working and stop at least 30 minutes after the end of the bag cleaning or, anyway, after a sufficient time to allow the total dust evacuation by the conveyance system.

8.3.2 Logic of the Dust Discharge System

System Elements/Components:

The dust evacuation system ensures, by means of screw conveyors and rotary valves or other components, if any, the dust collected by the bag filter is collected and conveyed to a point signalled by the customer.

The power and control system of the dust discharge system is usually provided by the customer and can include dust discharge and/or transport components not supplied by Boldrocchi.

In particular, a typical example of dust transport unit can be the following one:

- ◆ No. 1 screw conveyer 1 below the bag filter, for the evacuation, provided with electric driving motor.
- ◆ No. 1 rotary valve for the discharge of the dust transported by the screw conveyer, provided with electric driving motor.
- ◆ No. 1 collecting screw conveyer 2 for the transport and discharge form the rotary valve to a fixed point, provided with electric driving motor.

General Remarks About the Control Logics of the Functional Group (Dust Discharge System)

All dust transport components (screw conveyers & rotary valves) consist of a driving motor. An alarm signal through overload cut-out shall be provided to detect any malfunctions of the machine.

During the machine running, the control system shall detect any failures, produce an alarm and stop the machine. Besides, the control system interlocks the operation of the various dust transport machines, thus avoiding that a machine can be started if a machine installed after it isn’t running to avoid obvious problems.

The starting sequence of the dust transport could be the following one:

- Start of Collecting Screw Conveyer no. 2;
- Pause 10”;
- Start of Rotary Valve;
- Pause 10”;
- Start of Screw Conveyer 1 below the filter;
- Activation of the signal “Running Dust Transport”.

For the stop sequence consider the indications in the chapter Bag Cleaning about the final cleaning. In substance, if only one stop control is installed for the plant, the dust transport system shall be stopped half an hour after the fan stop and therefore after the beginning of the final cleaning of bags.

On the contrary, if the dust stop sequence is controlled by an operator, he shall remind not to stop the dust transport during the final cleaning of bags and the following discharge from hoppers.

Anyway, the stopping sequence of the dust transport system shall start the following system:

- 1) Stop of the screw conveyer no. 1 below the filter;
- 2) Pause 120" (adjustable time);
- 3) Stop of rotary valve;
- 4) Pause 120" (adjustable time);
- 5) Stop of screw conveyer no. 2;
- 6) After the stop of the last equipment, activation of the signal "standstill dust transport".

As you can see, we have avoided a stop sequence with long pause times (normally used to evacuate dust in sequential mode), because the dust transport system is the classic functional group that should always be running even with standstill fumes suction. In this connection, we recommend the operator who is stopping the dust transport system to check the completion of the sequence of the final bag cleaning (lasting about half an hour after the fan stop), as well as the following emptying of hoppers and screw conveyers (lasting about half an hour). It should be considered that during the final cleaning a considerable quantity of dust falls into the hopper and shall be evacuated.

9 Maintenance Instructions

This chapter supplies the information for the correct maintenance operations for the filter.

The plants, and the single components, of the Company BOLDROCCHI S.r.L. Division ECOLOGIA are designed to make maintenance operations as simple and rapid as possible. The strict observance of the maintenance operations described in this chapter ensures a good preservation and satisfying operation of the filter.

ATTENTION

IN CASE OF ANOMALY OR MALFUNCTION OF ANY FILTER COMPONENT, CHECK THE INSTRUCTIONS SUPPLIED IN THIS MANUAL HAVE BEEN OBSERVED IN ITS USE. INTERVENTIONS SHALL BE PROMPTLY CARRIED OUT AT THE FIRST OCCURENCE OF ANOMALIES TO AVOID A WORSENING OF THE MALFUNCTION AND DAMAGES TO OTHER FILTER PARTS.

This chapter describes the operations to carry out for a correct maintenance of the filter.



Attention

All maintenance operations shall be carried out with standstill plant and disconnected electric and compressed air feeding lines. To carry out this disconnection use the electric disconnecting switch installed before the electric connection and the compressed air on-off valve.

9.1 General Maintenance Safety Standards

During maintenance and repair operations keep to the following instructions:

- Don't clean the electric parts of machines with water or other fluids.
- In case of use of detergents, wear suitable protective clothes (glasses, gloves, etc.).
- Pay attention that all handles, steps and platforms are free from oil, grease or other products that could cause the operator's slipping.
- Wear shoes with antislip soles, gloves and clothes suitable for the operations to be carried out.
- Check any possible damages on control elements and replace these pieces.
- All repair operations shall be superintended by a manager.
- During the whole operation the cut-out switch shall remain off.
- In order to clear the control board some safety rules shall be observed:
 - Disconnect voltage;
 - Make sure a new connection is impossible;
 - The adjacent live parts shall be suitably protected;
 - Prevent the starting by unauthorized people by using a lock or by disconnecting the feeder lines.
 - Repair operations on the machine shall be carried out only by suitably trained skilled personnel. These personnel shall carefully carry out the operations to avoid damages to persons and machines.
 - Before each starting, the manager shall check the operations have been completed, all safety devices are correctly working and there are no unauthorized persons in the area.
 - Carefully clean the single machines. Always carefully clean, with a dry rag, rods and slide guides of the various units of the single machines.

DON'T USE A COMPRESSED AIR JET FOR CLEANING

- When it's absolutely necessary to use a compressed air jet to clean inaccessible part, pay attention to the jet direction to avoid the forced penetration of impurities in the recesses of bearings, cylinders or other devices.
- Check there are no material scales and/or clogs in machines.

9.2 General Preventive Maintenance Plan

The following proposals are simple indications susceptible of modifications and suggestions, according to the type of dust collection plant, the operating periodicity and various other factors.

9.2.1 Weekly Inspection Plan

- **Dust Deposits:** remove dust deposits from every equipment, particularly on all electrical components;
- **Hopper:** by opening the hopper inspection door check the correct operation of dust discharge components and the absence of dust deposits.
- **Screw Conveyors and Rotary Valves:**
 - Check the shaft seal and the presence of dust deposits, if any; in case of deposits, grease the shaft seal and correctly adjust the packing.
 - Grease shaft bearings;
 - Locate any apparent visual defects, vibrations and anomalous noise.
- **Electric Motors:** visually inspect the motor:
 - remove any dust deposits;
 - ensure a good ventilation;
 - check the conditions of connections and bolts;
- **Compressed Air Line:** check and discharge condensate (if any) on the pressure reducing filters at the inlet of the compressed air line

9.2.2 Monthly Inspection and Maintenance Plan

- **Bags:** open the filter and check the conditions of bags; if necessary, replace the damaged bags;
 - Check the presence of dust deposited on the bag supporting plate; it's the first indication of broken bags;
 - Remove a series of sampling bags; record the bags removed each time during the year and vary sampling areas by rotation;
- **Door Packing:** check the conditions of the packing and replace it, if necessary. The monthly check can be carried out simply by checking the filter upper part to verify the presence of air leaks; That proves there is no tightness in these areas and the packing shall be replaced;
- **Compressed Air Tank:**
 - Check the perfect conditions of pneumatic connections; here the check is simply visual;
 - Check the tightening of pipe fittings;
- **Screw Conveyer:**
 - Grease the shaft seal;
 - Visually check the screw inside through inspections doors;
- **Bearings:** check the bearing temperature, which shall not exceed 70°C for screw conveyors transporting material at ambient temperature usually not over 90°C;
- **Electric Motors:** clean the filters and cooling fans of electric motors every month
- **Gear Motors:** check the oil level

9.2.3 Yearly Inspection and Maintenance Plan

The yearly inspection can be carried out during the planned stops of the plant.

- **Bags:** yearly check and complete replacement, if necessary
- **Door Packing:** yearly check by opening of each door and check of the packing conditions
- **Gear Motors:**



- Complete oil replacement;
- In case of standstills over six months, mineral oils lose their characteristics and shall be replaced

10 Instructions for the Filter Routine Repairs

This chapter lists the most common malfunctions occurring during the filter operation.

ATTENTION

ALL MAINTENANCE OPERATIONS SHALL BE CARRIED OUT WITH STANDSTILL PLANT AND DISCONNECTED ELECTRIC AND COMPRESSED AIR FEEDING LINES.

To carry out this disconnection use the electric disconnector installed before the electric connection and the compressed air on-off valve.

It's advisable to use only original spare parts of BOLDROCCHI S.r.L. Division ECOLOGIA, since they are the only ones to assure a perfect interchangeability and to be guaranteed and also dimensionally tested. Shouldn't your malfunction be listed below or be removed through the described operations, consult immediately BOLDROCCHI S.r.L. Division ECOLOGIA or a technician authorized by them.

10.1 Malfunctions – Causes – Corrective Actions

This paragraph will be a memorandum helping the operator to find corrective actions for a filter malfunction.

MALFUNCTION: Too low pressure drop (values below 60÷80 mm column of water)

CAUSE: Dust doesn't settle on the bag surface and the filtering cloth doesn't stabilize

CORRECTIVE ACTION: increase the pause time of cleaning valves. Wait for the stabilization of the pressure drop till reaching a value of 100÷120 mm column of water. This malfunction is usual after the replacement of filter bags.

MALFUNCTION: Scarce dust outlet from the chimney

CAUSE: one or more bags are damaged

CORRECTIVE ACTION: isolate the filter, open the upper doors and inspect the inside. In case of damaged bags, the Venturi injector and the upper part of the respective blowing pipe are usually dusty. Replace the damaged bags. Check the type of damage and find the cause. In this case it's advisable, anyway, to consult our Technical Department to examine the malfunction together.

MALFUNCTION: High pressure drop (the indicated values exceed 220÷240 mm column of water)

CAUSE: the pressure of the air or of the cleaning fluid is insufficient (< 5 bar). At each blow it drops to values below 4,5 bar.

CORRECTIVE ACTION: increase the feeding pressure values up to 6 bar again. Check moreover that the available flow rate corresponds to the design value indicated in the filter data sheet. Check there are no leaks.

CAUSE: wrong setting of pause time

CORRECTIVE ACTION: reduce the pause time of cleaning valves

CAUSE: defective solenoid valve or pneumatic valve membrane

CORRECTIVE ACTION: check both components: if the solenoid valve doesn't close, the membrane valve remains open and constantly blows off compressed air; if the solenoid valve doesn't open, the membrane valve remains closed and the respective row of bags isn't cleaned.

This malfunction can be caused by a foreign matter or by dust. Remove membranes, replace them if damaged and carefully clean the inside by removing obstructions, if any.

CAUSE: wrong setting of blowing times in the sequencer electronic control board. This malfunction is characterized by a particular noise during blowing.

CORRECTIVE ACTION: reset the blowing time at the original values. The correct setting is characterized by a sharp and hollow noise during blowing.

On this matter, see the detailed instructions in the sequencer manual. This operation shall be carried out by qualified personnel.

CAUSE: humidity in the sucked fumes. A layer of sticky dust settles on the bag surface and can't be removed by the cleaning system.

CORRECTIVE ACTION: remove humidity infiltrations. Check the operating temperature remains at the set design value.

In case of this malfunction, it's advisable to consult the Technical Department of BOLDROCCHI S.r.L. Division ECOLOGIA.

CAUSE: bags are by now at the end of their normal operating cycle. The cloth is by now completely degraded.

CORRECTIVE ACTION: replace filter bags.

MALFUNCTION: excessive compressed air consumption

CAUSE: air leaks from the circuit

CORRECTIVE ACTION: check there are no leaks. Check pneumatic valves aren't damaged and replace them, if necessary.

CAUSE: too short pauses between a blow and the following one, too long blowing times.

CORRECTIVE ACTION: set correct pause and blowing times.

MALFUNCTION: visible dust discharge from the fan outlet

CAUSE: incorrect assembling of bags

CORRECTIVE ACTION: new correct assembling, after careful cleaning of the plenum area crossed by the dust flow.

CAUSE: damaged bags

CORRECTIVE ACTION: locate and replace them. If the defect is located in well defined areas, consult BOLDROCCHI S.r.L. Division ECOLOGIA to identify and remove the cause.

10.2 Service

It's advisable for the Customer to promptly contact the qualified technical personnel of BOLDROCCHI S.r.L. Division ECOLOGIA in case of malfunctions not included in the paragraph 10.1.

To identify the machine indicate the following data:

- Type of machine:
- Construction year:
- Serial number:
- Reference item:

11 Personnel's Training

11.1 Definition

The MACHINE DIRECTIVE CEE 98/37, defines the operator at point 1.1.1.3:

“OPERATOR” is the person, or persons, charged with the installation, operation, setting, maintenance, cleaning and repair of a machine.

This chapter presents the operator charged with the operation of the filter equipment and with normal cleaning operations; the other duties carried out by operators as mentioned in the directive are performed by qualified technical personnel of BOLDROCCHI S.r.L. Division ECOLOGIA.

11.2 Personnel's Training for the Plant Normal Use

The operator requires no specific professional qualification for the filter use in normal conditions.
Training aims at preparing the personnel for an easy use of the filter functions.

11.2.1 Theoretic Know-How to Be Acquired By the Trained Personnel

- Duties and professional capabilities of the personnel charged with the maintenance, transport, installation, assembling, repair, disassembling, dismantling of filter components;
- Technologies applied to the bag filter;
- Filter setting at work and shut-down;
- General safety rules on working site;
- Standards for a correct filter use;
- Procedure to follow in case of anomalies during the filter operation;
- Procedure to follow for inspection and periodical maintenance as well as behaviour in case of accidents;
- Contents of this manual.

12 Filter Dismantling

12.1 Filter Dismantling

For filter dismantling it's necessary:

- To disconnect the filtering equipment from the electric supply and the pneumatic feeding plants, in reverse order as to the description in CHAPTER 7 of this manual;
- To remove, as far as possible, machine parts (for ex.: protection papers, lamps, handles, motors, actuators, etc...) by dividing them according to their nature (for ex.: pipes, rubber components, steel, aluminium, copper components...);
- Before scrapping inform the competent authorities by written notice in compliance with the regulations in force in the single country;
- After receiving the authorization of the above mentioned authorities, proceed to the dismantling of components according to the prescriptions of effective regulations.

12.2 Disposal of Toxic-Noxious Substances

To proceed to the disposal of toxic-noxious substances, consult the prescriptions in force in the installation country.

ATTENTION

THE CUSTOMER IS THE ONLY RESPONSIBLE FOR ANY IRREGULARITY COMMITTED BY THE CUSTOMER HIMSELF BEFORE, DURING AND AFTER THE FILTER DISMANTLING AND DISPOSAL IN THE INTERPRETATION AND APPLICATION OF EFFECTIVE REGULATIONS.

13 Manual of Spare Parts

This chapter describes how to order the spare parts for the filter equipment and supplies a list of spare parts for the correct operation of the filter for a two-year period.

13.1 Order of Spare Parts

Spare parts are ordered by fax to:

BOLDROCCHI S.r.L. Divisione ECOLOGIA
Viale Trento e Trieste, 93
20046 Biassono (MI)
Tel.: ++39 39 22021
Fax.: ++39 39 2754188

Indicating:

- Reference job no.:
- Construction year:
- Machine type:
- Serial no.:
- ITEM:
- Machine description:
- Number of requested spare parts:
- Description of each spare part:
- Favourite shipping procedure, if any:
- Registered name, address, applicant's tax data and shipping address:
- Further useful information



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CENTRIFUGAL FAN INSTALLING, USE AND MAINTENANCE INSTRUCTIONS



INSTALLATION, OPERATION AND MAINTENANCE MANUAL

CENTRIFUGAL FAN

Type:

Item:

Our Job:

Year :

Customer:

Final client:

Plant location:

Ref. Order n°:

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1. INTRODUCTION

The purpose of this manual is to help you obtain the utmost in efficient, dependable performance from your BOLDROCCHI equipments.

Providing care is exercised in installing your BOLDROCCHI equipment - and it is given reasonable maintenance - you can be assured of trouble-free operation for a long time to come.

For specific instructions and recommendations on BOLDROCCHI equipment engineered to meet special and unusual requirements, it will also pray to contact our factory at Biassono (Milano).

Today there are thousands of BOLDROCCHI units which have been in reliable service ten, twenty, thirty years, or longer. We feel certain you will obtain equally fine results from your BOLDROCCHI equipment.



2. GENERAL INFORMATION

2.1. RECEIVING AND INSPECTION

Upon delivery of your BOLDROCCHI equipment, check first to see that all items on bill of lading and/or invoice have been received. It should be kept in mind that partial shipment of orders is often made.

By careful inspection, determine whether damage has occurred in transit. Even though BOLDROCCHI equipment is thoroughly checked at the factory before crating, rough handling enroute may dent the fan housing, bend the shaft, damage bearings, or cause other damage to fan and drive parts.

Any shortage or damage noted should be promptly reported to the carrier.

3. INSTALLATION

3.1. HANDLING

If a hoist is employed in handling an assembled unit, extreme care should be taken to prevent distortion or damage to any part of the equipment. The handling of large-sized units will require extra precaution in this respect.

In order to facilitate the operation of lifting and transport of the machine for the installation on the plant, are provide some eyebolts placed in position easily accessible where it is possible to hook the lifting rope.

Therefore it is necessary to hook the ropes to these eyebolts. Utilise at least 3 ropes and combine their length such that during the operations the rotation axis keeps possibly horizontal.

It is advisable to make sure of the lifting capacity of the crane in order to avoid damages due to slipping or clutches the machine and to staff on duty.

3.2. STORAGE

Locate the packages constraining the fan sheltered from impact or falling of bodies; avoid the direct contact with the ground, interposing blocks of wood or similar.

If installation of the fan is delayed and storage is made outdoors, provide reasonable weather protection as dictated by the climate and period of exposure. Bearings especially should be tightly covered to prevent the entrance of water; and if unit is to be stored outdoors for any length of time, it should be completely covered with a tarpaulin. Periodically the unit should be inspected to make sure no damage such as corrosion, is occurring.

the oil film or grease on the bearing and on the seals (at least one time a week). It is necessary periodically rotate the fan (also by hand) in order to restore

When a unit is stored or installed within a building still under construction, the entrance of dirt and construction materials to the fan - particularly to its bearings - should be prevented. The bearings should be covered and sealed with tape. It is opportune to shield the motor from the dirt, otherwise it will be necessary to carry out a cleaning before starting the fan.

On plants with STAND-BY machines it is necessary alternate periodically the working with running and stand-by (at least one time a month).

3.3. FOUNDATIONS

A rigid, level foundation is vitally essential for smooth, quiet operation, good performance, and low maintenance cost of fan equipment. An improperly constructed or inadequate foundation may cause vibration and possible mis-alignment of the fan and its prime mover.

Special attention must be given to insure a permanently solid support for the rotating assembly particularly for the bearing supports, for the prime mover, and for any gears or other devices connecting them.

If the fan is mounted on an oven or on another piece of equipment having rotating or other parts which may cause vibration, it is highly important that the foundation supporting the fan be rigid

enough to prevent such vibration being carried to the fan. The weight and operating speed of the fan should always be carefully considered in the design and construction of such supports.

Poured concrete foundations are preferred to those of masonry, steel or wood. Generally speaking, concrete foundations should have a *minimum* weight of three times the total weight of the fan wheel, shaft, bearings, and bearing supports.

A frequent error is to design structural steel foundations only for the weight to be carried without consideration of the live load due to rotating equipment. A structure foundation should always be riveted or welded together, rather than bolted, for bolts frequently become loose allowing the structure to vibrate.

Anchor bolts in concrete should be L or T shaped, and should be placed in pipe or sheet metal sleeves approximately 50 mm larger in diameter than the anchor bolts to allow for adjusting the bolts in case they move slightly when concrete is poured. Foundations must be level and an allowance must be made for a minimum of 15 mm of shimming and grouting when determining the top surface of the foundation.

If equipment is mounted of the ground level, it should be placed as near as possible to, or over, a solid wall or column. An overhead platform or support must be rigidly constructed and sturdily braced in all directions.

Considerable work can be saved in connection with a structural steel platform if it is perfectly level so that no shims are required. When bolting to steel where some adjustment may be required to level the unit, large-area shims should be placed under the fan before tightening the anchor bolts. Distortion of the equipment may occur when bolts are not tightened equally or if short thick shims providing only limited surface contact are used.

3.4. INSTALLATION



Position the fan in such a way to assure a minimum space for the maintenance and repair work.

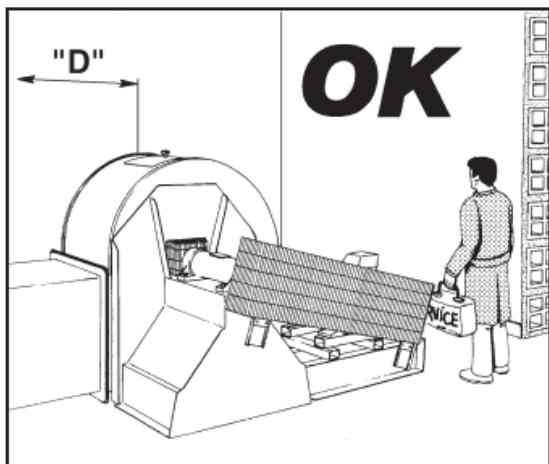
For fans with inlet not ducted the distance "D" from the wall must be higher or at least equal to the inlet diameter.

We recommend to put a safety barrier to prevent possible accidental approach to fan unducted inlet or outlet.

Take the anti-vibrations supports (if included with the supply) from the plastic bag attached to the fan.

Lift up the fan, remove the wood feets

and install the antivibrations supports.



4. INITIAL OPERATION

- 1) Prior to starting up unit, all foundation bolts and set screws should be inspected and tightened if necessary.
- 2) Make certain that bearings are properly lubricated.
- 3) Check alignment of shaft and bearings - and couplings and drivers on direct connected units - realigning if necessary. In correcting coupling mis-alignment it is usually simpler to move the driver without disturbing the fan.
- 4) Check location of wheel in relation to fan inlet.
- 5) On V-belt drive equipment, check drive for proper alignment and tension.
- 6) Turn over rotating assembly by hand - checking to see that it runs free and does not bind or strike housing at any point. If assembly binds, this may be due to distortion of housing, or bearing support being drawn down on an uneven foundation. Loosen foundation bolts and, if assembly now seems free, recheck foundation. Shim where necessary to level unit and prevent distortion when equipment is bolted down. Alignment should again be checked.
- 7) Check connections from fan to ductwork, making certain that the fan housing is not distorted in any way. Ducts should never be supported by the fan unit. Expansion joints should be used in all connections where expansion is likely to occur in the ducts of the unit. Fans mounted on noise isolation bases should have flexible connections between the ducts and the fan.
- 8) Apply just enough power to turn fan over, and check for correct direction of rotation of the unit. The fan driver should be started in accordance with manufacturer's recommendations. Any dampers in the system should be at least partially closed during starting periods to reduce power requirements. This is particularly important in the case of a fan designed for high temperature operation being "run in", at room temperature or at appreciably less than design temperature. When the gas is up to operating temperature, the damper may be opened. Completely closing dampers should be avoided, since this will occasionally cause a fan to run rough.
- 9) If the inlet or the outlet of the fan are not ducted, it is important to attach a suitable protection screen. Check the earth connection. At this point start the motor. Check if the rotating direction is the same as the one shown on the target. If it goes in a different direction, shut off the power supply and reverse the phases in the connection box.
- 10) Fan may now be placed in operation; however, a close watch should be kept for anything unusual such as vibration, overheating of bearings and motor, etc. On units equipped with multispeed motors, it is desirable to check initial operation at lowest speed first, and run at high speed only after slow speed operation is determined satisfactory. Before starting up fan, water should be turned on for bearings requiring water cooling. After unit is up to temperature, the flow of water should be checked. It is not necessary for a large volume of water to flow - the amount will vary with conditions. The water flow should be such that a rise of not over 8 - 10°C, in water temperature is noted. Maximum leaving temperature should not exceed 40°C. Too much water may cool the sleeves to a point where moisture condensation with its resultant danger to lubrication may occur.
- 11) At first indication of any trouble or undue vibration, shut down fan and recheck for cause of difficulty. Unit should be stopped in accordance with driver manufacturer's recommendations.

Excessive vibration can be caused by the following:

- a) Unbalance in fan, drive or driver.
- b) Mis-alignment of bearings, couplings, or V-belt drives.

- c) Loose anchor bolts.
- d) Damaged parts, such as a sprung shaft.
- e) Mis-aligned or out-of-balance drive sheaves, or possibly out-of-balance motors.
- f) Improper foundation.
- g) Presence of dirt or foreign material on rotating parts.
- h) Loose set screws holding fan wheel.
- i) Pulsations in system or vibration of ducts.
- j) Unbalance due to uneven erosion of wheel or damage caused by materials passing through fan.
- k) Loose bearing adjustment screw on top of ring oiled bearing casing.
- l) Transmitted vibration to unit from other machinery and building structures.

4.1. IMPORTANT NOTICE

- **Temperature and rotation**

Fan working at lower revolutions per minute and higher temperatures than the contractual values is forbidden.
 Fan working at lower revolutions must be authorized by the manufacturer in order to avoid resonance frequencies.

- **Adjustment of the r.p.m.**

Adjustment shall not cause excessive accelerations or decelerations of the impeller.
 The maximum allowed value to avoid breaking due to overwork in a short time is 0.5 rad/sec².

In any case a fan with r.p.m. adjustment is more likely subject to accelerations and is also crossed by the frequencies of the other components which are the cause of shorter fan life.
 We recommend a complete revision of the fan every two years and replacement of the impeller every 0.5 million variations of the r.p.m.

- **Working at high temperatures
(> 100°C)**

Before turning the fan off, make it work with fluid at lower temperature until impeller and shaft reach a temperature of 90°C to avoid damage to bearings and deterioration of the lubricant.

Pay attention to: fan working at reduced r.p.m. (r.p.m. regulator) reduces the cooling wheel efficacy.

A sudden stop (power failure) causes bearings temperature increase; it is therefore necessary an intervention with additional air flow from outside through a safe air generator (compressed air or small service fan) so that the bearing support temperature never exceeds 90°C.



5. MAINTENANCE

To insure continuous, trouble-free operation, a definite time schedule for inspection and lubrication of bearings should be established at the outset. This schedule will depend on operating conditions and the practical considerations involved.

Alignment of bearings should be checked at regular intervals to see that they remain in correct relative position. Mis-alignment will cause over-heating, excessive wear to dust seals, and premature bearing failure.

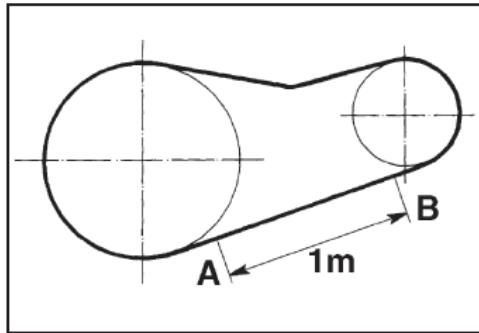
Periodically foundation bolts and all set screws should be inspected to see that they have not loosened.

In cases where material passes through the fan, it may be necessary to provide shut-down periods for cleaning the wheel and interior of housing. Fans handling abrasive materials, of course, should be inspected for wear of parts at frequent intervals. Even if the fan handles air only, considerable dirt may accumulate on the wheel and housing; and it is well to check the fan interior for such a condition. Repainting of exterior and interior parts of fan and ducts will materially prolong the service life of the installation. In selecting a paint, always choose one that will withstand the temperature of the air which the fan handles. For normal temperature installations, a good machinery paint may be used. If moisture is excessive or if fans are exposed to the weather, bitumastic paint is suitable. For fans handling corrosive fumes, competent advice should be secured to obtain a suitable paint for the conditions involved.

Never run a fan having an unbalanced wheel, since this very often will cause premature failure of bearings springing of shaft, or other serious damage. Such a wheel should be balanced immediately.

5.1. BELTS STRETCHING

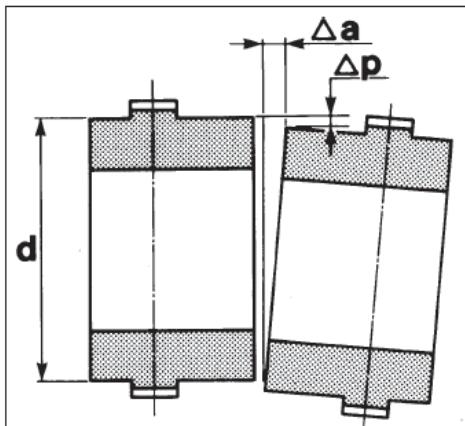
Before belts tensioning mark on the tensioned belt a line A-B of 1 meter and then make the first tensioning until you extend the line A-B of 5 mm



After 2 days make the second tensioning until to extend the line A-B of 3 mm more.

After 2 days make the third tensioning until to extend the line A-B of 2 mm more, for a total extension of 10 mm.

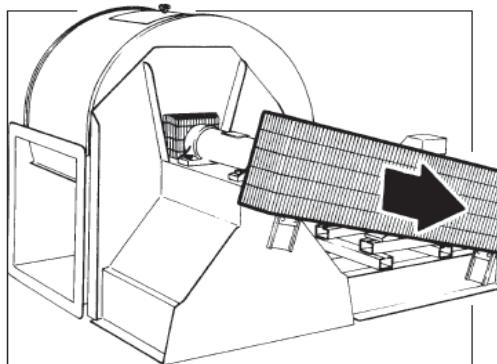
5.2. CORRECT ALIGNMENT



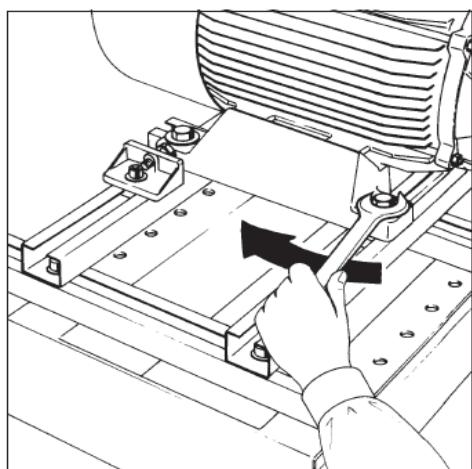
The maximum tollerate misalignments (Δa = angular misalignment
 Δp = parallel misalignment) are as shown in the table

d (mm)	Δa (mm)	Δp (mm)
$d \leq 85$	0,20	0,08
$85 < d \leq 130$	0,35	0,13
$130 < d \leq 180$	0,48	0,18
$180 < d \leq 230$	0,62	0,25
$230 < d \leq 280$	0,80	0,33
$280 < d \leq 350$	1,0	0,43

5.3. REPLACING THE BELTS



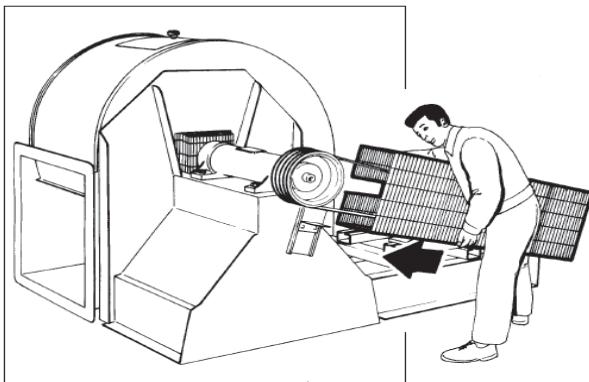
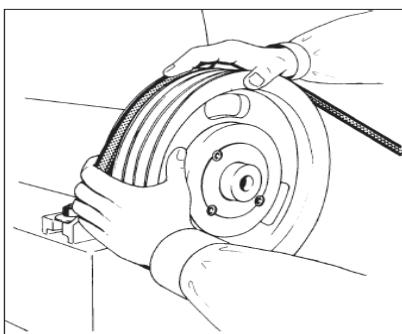
Owing to natural wear and tear the belts will need to be replaced with a frequency depending on the running conditions.



To dismantle the belts first of all remove the transmission guard,

then release the screws for the motor,

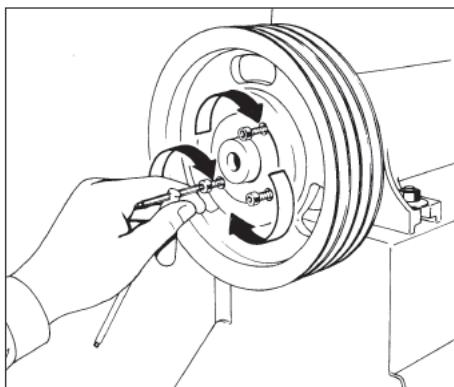
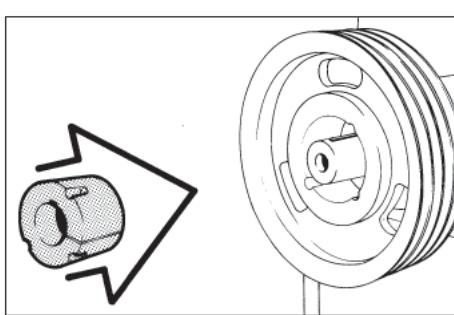
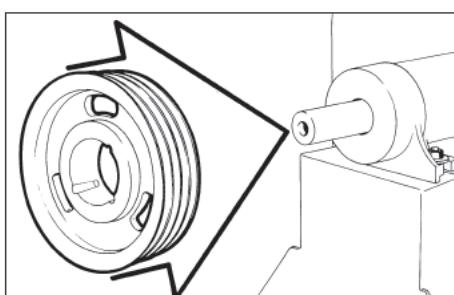
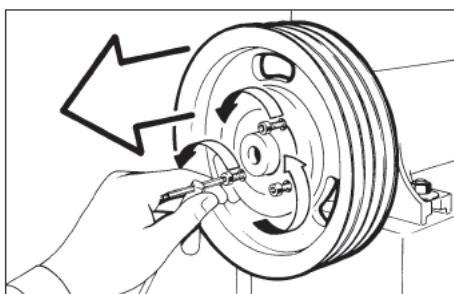
and turn the adjustment screws to reduce the distance between the motor pulley and the fan pulley.



At this point it is possible to change the belts installing new belts of the same type.

Turning the adjustment screws bring back the motor and check the tension of the belts as previously explained, and then fasten the motor onto the stretchers.

Refit the belts guard and fully tighten the bolts.



I. REPLACING THE PULLEYS

It is important to periodically check the state of the channels in the pulleys and, if necessary, to change them. It is important to note that the tension of the belts, and the alignment of the

transmission are significant factors in prolonging the life of the pulleys. The pulleys with conical bush are replaced as follows:

release the three screws and insert one of them in the free hole; turn the screw in until the complete unlock

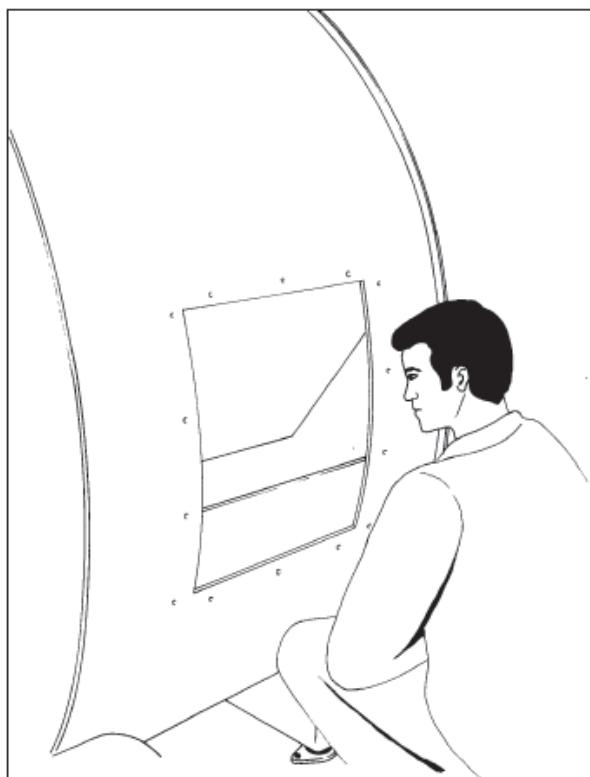
clean the bush shaft support with a cloth but don't grease it

mount the pulley on the fan shaft

insert the bush in the pulley taking care that the threaded half holes of the pulley coincide with the nonthreaded half holes of the bush

put in and tighten the three screws evenly and alternating between them until the pulley is fully fastened

check that the pulleys are statically and dynamically balanced.



5. PERIODICAL CHECKS

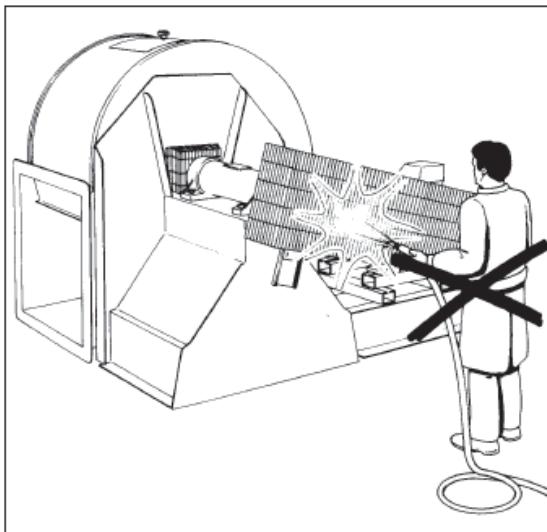
We recommend a complete overhaul of the bearings and the supports once a year, washing them with mineral oil (light petrol) and then lubricating them with new grease:



It is also recommended to check the impeller periodically (every 3 months) through the inspection door, especially if you note vibrations.

It is also recommended to check periodically (every 6 months) tensioning of the belts, alignment of the V-belt drive and of the coupling joint as well as status of anti-vibration supports.

5.6. CLEANING



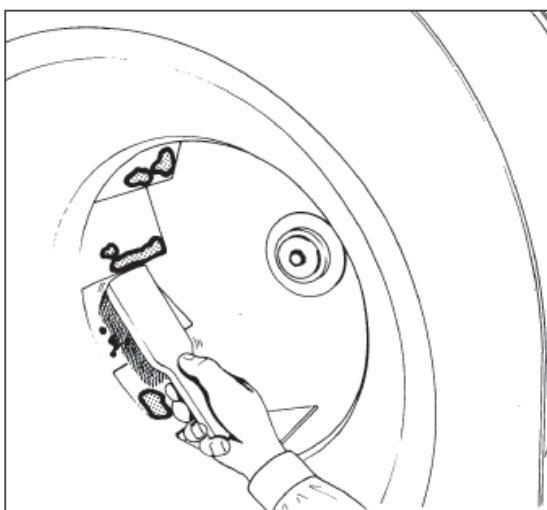
In order to prolong the life and good working order of the fan it should periodically have a general clean.

Attention

Before proceeding with the cleaning shut off electrical power to the fan.

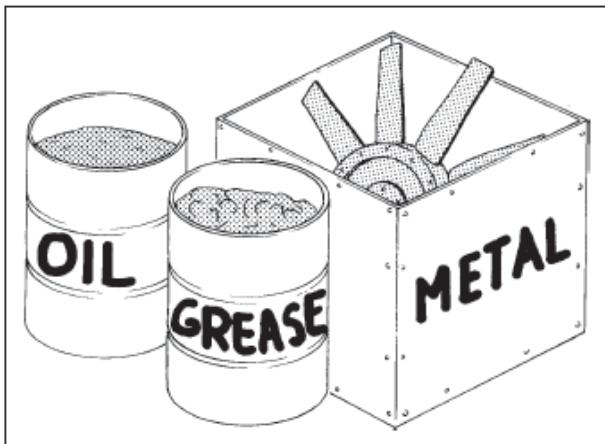
For the cleaning it is sufficient to use a damp cloth with water or detergent. Do not uses solvents that could damage the painting or the seals.

Attention Jets of water must not be directed onto the fan.



If the impeller is encrusted with matter, it should be thoroughly cleaned using a wire brush, removing all the bits with a vacuum cleaner.

5.7. PUTTING OUT OF SERVICE AND DISMANTLING



When dismantling the machine, set aside all still functioning parts in order to re-use them.

Separate the materials according to type: iron, rubber, oil, etc.

Rubbish must be collected in special containers bearing labels, and disposed of in compliance with local laws in force, going to companies specialised in the disposal of waste.

Attention

Do not dispose of toxic wastes in municipal sewerage and drain systems. Uncertified scrap materials can be disposed of at municipal rubbish dumps.

6. SCOPE AND PROTECTION

6.1. MACHINE UTILISATION RESTRICTIONS

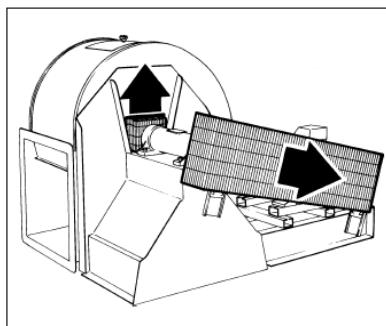
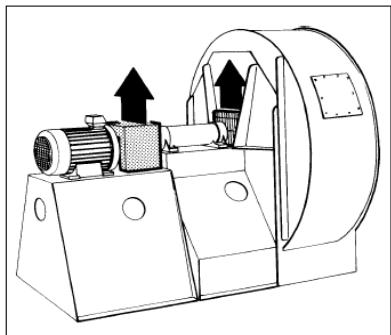
- The machine has been designed to be employed with inlet/outlet connected (to the system).
- The max. temperature of the fluid handled must be design temperature shown in the data sheets.
- The max. usable speed of rotation is the one shown in the machine name plate.
- The E-Motor power supply has to be in compliance with the rating shown on the name plate.



The ambient conditions, for which the machine has been designed, are the ones indicated on the data sheet. Different utilisation conditions can compromise the functionality and the safety of the machine.

6.2. GENERAL RULES

The protection guards are not to be removed, unless absolutely necessary for maintenance purposes, in which case appropriate steps must be taken to clearly indicate the possible danger.



The protection guards must be re-installed on the machine as soon as the maintenance work has finished.

All maintenance work (routine or extraordinary) must be done with the fan stopped and all electrical, pneumatic, and steam, etc supplies disconnected.

In order to ensure that such supplies are not mistakenly reconnected it would be advisable to place notices on the electrical panels, the power units and the control pulpits with the following sentence :"Attention : controls suspended for maintenance".

Before connecting the power supply cable to the fan's connection box, check that the line voltage is the same as the one shown on the motor's data plate.

Take note of the tags placed on the fan.

Replace the tags if they should become illegible over time.

6.3. MAINTENANCE RULES

Maintenance staff must not only comply with current safety prevention regulations but also the following rules:

It is important that suitable safety prevention clothing is worn.

These must not have loose parts that can get caught in the machine.

Special earphones or protectors must be used when noise exceeds permitted levels.

It is important to check that there is an interlocking device preventing others from starting up the machine.

6.4. DANGERS DURING OPERATION

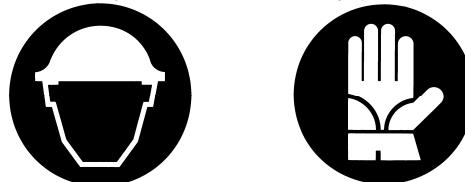


The machine has been designed by the manufacturer in order to assure safe utilisation conditions; the exclusion of the provided protections compromise seriously the safety conditions.

Some warning signs have been fixed on the machine showing dangers for which it is advisable that the staff working round is provided with suitable protections and respect the described instruction

In particular the warning signs are :

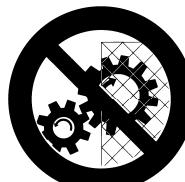
- for presence of corners it is necessary the use of safety protections such as helmet, gauntlets.



- owing to the noise it is necessary to use ear-phone or ear protections near the machine.



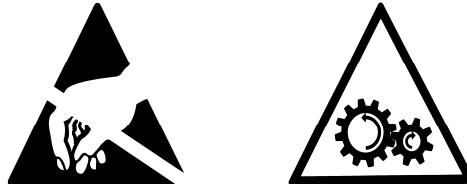
- for presence of external moving devices it is forbidden to remove the protection covers placed on V-Belts transmission.



- for presence of external moving devices it is forbidden to remove the protection covers placed on the couplings.



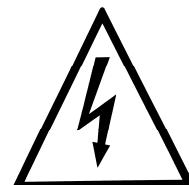
- for the presence of internal moving elements, it is dangerous introduce the hands in the casing through the inspection doors during machine operation.



- for presence of moving devices it is forbidden to make maintenance during machine operation (except for bearings greasing).



- for presence of live parts it is dangerous to operate inside the terminal box with power supply connected.



 The inspection doors and the motor terminal box have to be closed during machine operation.

6.5. LIMIT OF MANUFACTURER RESPONSIBILITY

The manufacturer has no responsibility if occur the following circumstances:

- The machine is unproperly used or is handled by not qualified staff or not enough trained.
- The machine is not correctly placed according to what indicated in this manual.
- The e-motor driver is not correctly connected from the supply.
- The machine is installed in place that does not respect the condition for which has been designed ,indicated in the data sheet attached.
- The machine has not been submitted to the routine maintenances and to the necessary special maintenance.
- The machine has been modified by the customer in any part without any written permission of the manufacturer.
- The machine has been submitted to maintenance using not-original spare parts.
- The machine has been subjected to events due to acts of God such as alluvions, earthquakes and so on and it has been reinstalled without the necessary verifications.
- The user has not respected the instructions of the manual.

6.6. PROTECTION DEVICES

The machines is equipped with a set of protections in order to allow a safe utilisation.

- In particular some protective carters has been carry-out in order to avoid the accidental contact .
- In order to reduce the noise in the allowable limits the fan has the casing fully insulated.
- In order to attend the machine vibrations, on the supports are applied some detectors for which it is possible to set some alarm thresholds that when are surpassed an anomalous operation of the machine is pointed out.
- The various regulations regarding phonometric monitoring in the test room, establish very exact procedures and environmental conditions for measuring the sound pressure level LpA.

In practice not all the installations are made or can be made in compliance with these regulations. There are often operating conditions, accessories and environmental situations that differ from the test rooms.

This is generally the cause of the difference between sound pressures indicated in catalogues, and the ones obtained from the installation. There are various causes for this difference.

- Actual use differing from that selected in catalogues:
- traditional flexible connections between fan and ducts
- inlet vane control :
- electrical motor :
- position of fans with electric motor in the environment :
 - Installed near a wall without any absorbent property :
 - Installed near where two walls meet :
 - Installed near where two walls meet in a room with a low ceiling :
 - environment noise.



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SPARE PARTS



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SPARE PARTS

1	BAG FILTER	64F1	QUANTITY				PRICE
	DRAWING STD-RIC-BF-01		POS.	INSTALL.	1st	2 YEARS	[euro]
Filtering bags [mmxmm]	160 X 3500	SR1603500ACNN	1	822	9	411	
Cages [mmxmm]	160 X 3500	SR1603500FG	2	822	17	165	
Kit membrane	1 1/2 "	KM1 1/2 "	3	46	1	23	
Pilot group+spool+cover	1 1/2 "	GP1 1/2 "	4	46	1	23	
Pressure reducer		GTAC	5	1	0	1	
Economizer		ECO60	6	1	0	1	
Kit for connecting blowing pipes	Rubber	MG1 1/2 "	7	46	1	23	



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1	BAG FILTER	64F2	QUANTITY				PRICE
	DRAWING STD-RIC-BF-01		POS.	INSTALL.	1st	2 YEARS	[euro]
Filtering bags [mmxmm]	160 X 3500	SR1603500PPNN	1	322	4	161	
Cages [mmxmm]	160 X 3500	SR1603500FG	2	322	7	65	
Kit membrane	1 1/2 "	KM1 1/2 "	3	18	1	9	
Pilot group+spool+cover	1 1/2 "	GP1 1/2 "	4	18	1	9	
Pressure reducer		GTAC	5	1	0	1	
Economizer		ECO19	6	1	0	1	
Kit for connecting blowing pipes	Rubber	MG1 1/2 "	7	18	1	9	



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SPARE PARTS

1	BAG FILTER		62F1				
	DRAWING STD-RIC-BF-01	DESCRIPTION	CODE	POS.	INSTALL.	1st	2 YEARS
							[euro]
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	25	1	13
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	25	1	5
	Kit membrane	1 "	KM1 "	3	5	1	3
	Pilot group+spool+cover	1 "	GP1 "	4	5	1	3
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO5	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	5	1	3

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SPARE PARTS

1	BAG FILTER		62F2				
	DRAWING STD-RIC-BF-01	DESCRIPTION	CODE	POS.	INSTALL.	1st	2 YEARS
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	25	1	13
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	25	1	5
	Kit membrane	1 "	KM1 "	3	5	1	3
	Pilot group+spool+cover	1 "	GP1 "	4	5	1	3
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO5	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	5	1	3



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SPARE PARTS

1	BAG FILTER		62F4				
	DRAWING	STD-RIC-BF-01			QUANTITY		PRICE
	DESCRIPTION		CODE	POS.	INSTALL.	1st	2 YEARS
Filtering bags [mmxmm]	152 X 2000		EL1522000PPNN	1	25	1	13
Cages [mmxmm]	152 X 2000		EL1522000FG	2	25	1	5
Kit membrane	1 "		KM1 "	3	5	1	3
Pilot group+spool+cover	1 "		GP1 "	4	5	1	3
Pressure reducer			GTAC	5	1	0	1
Economizer			ECO5	6	1	0	1
Kit for connecting blowing pipes	Rubber		MG1 "	7	5	1	3

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SPARE PARTS

1	BAG FILTER		62F5				
	DRAWING STD-RIC-BF-01			QUANTITY			PRICE
	DESCRIPTION	CODE	POS.	INSTALL.	1st	2 YEARS	[euro]
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	25	1	13
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	25	1	5
	Kit membrane	1 1/2 "	KM1 1/2 "	3	5	1	3
	Pilot group+spool+cover	1 1/2 "	GP1 1/2 "	4	5	1	3
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO5	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 1/2 "	7	5	1	3

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SPARE PARTS

1	BAG FILTER	65F2					
	DRAWING STD-RIC-BF-01			QUANTITY		PRICE	
	DESCRIPTION	CODE	POS.	INSTALL.	1st	2 YEARS	[euro]
Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	25	1	13	
Cages [mmxmm]	152 X 2000	EL1522000FG	2	25	1	5	
Kit membrane	1 "	KM1 "	3	5	1	3	
Pilot group+spool+cover	1 "	GP1 "	4	5	1	3	
Pressure reducer		GTAC	5	1	0	1	
Economizer		ECO5	6	1	0	1	
Kit for connecting blowing pipes	Rubber	MG1 "	7	5	1	3	

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SPARE PARTS

1	BAG FILTER		65F9				
	DRAWING STD-RIC-BF-01	DESCRIPTION	CODE	POS.	INSTALL.	1st	2 YEARS
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	25	1	13
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	25	1	5
	Kit membrane	1 "	KM1 "	3	5	1	3
	Pilot group+spool+cover	1 "	GP1 "	4	5	1	3
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO5	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	5	1	3

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SPARE PARTS

1	BAG FILTER		64F3				
	DRAWING STD-RIC-BF-01				QUANTITY		PRICE
	DESCRIPTION		CODE	POS.	INSTALL.	1st	2 YEARS
Filtering bags [mmxmm]	152 X 2000		EL1522000PPNN	1	25	1	13
Cages [mmxmm]	152 X 2000		EL1522000FG	2	25	1	5
Kit membrane	1 "		KM1 "	3	5	1	3
Pilot group+spool+cover	1 "		GP1 "	4	5	1	3
Pressure reducer			GTAC	5	1	0	1
Economizer			ECO5	6	1	0	1
Kit for connecting blowing pipes	Rubber		MG1 "	7	5	1	3

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SPARE PARTS

1	BAG FILTER		65F6				
	DRAWING STD-RIC-BF-01			QUANTITY			PRICE
	DESCRIPTION		CODE	POS.	INSTALL.	1st	2 YEARS
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	15	1	8
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	15	1	3
	Kit membrane	1 "	KM1 "	3	3	1	2
	Pilot group+spool+cover	1 "	GP1 "	4	3	1	2
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO3	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	3	1	2

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SPARE PARTS

1	BAG FILTER		65F7				
	DRAWING STD-RIC-BF-01			QUANTITY			PRICE
	DESCRIPTION		CODE	POS.	INSTALL.	1st	2 YEARS
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	15	1	8
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	15	1	3
	Kit membrane	1 "	KM1 "	3	3	1	2
	Pilot group+spool+cover	1 "	GP1 "	4	3	1	2
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO3	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	3	1	2

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SPARE PARTS

1	BAG FILTER		65F8				
	DRAWING STD-RIC-BF-01			QUANTITY			PRICE
	DESCRIPTION		CODE	POS.	INSTALL.	1st	2 YEARS
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	15	1	8
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	15	1	3
	Kit membrane	1 "	KM1 "	3	3	1	2
	Pilot group+spool+cover	1 "	GP1 "	4	3	1	2
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO3	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	3	1	2

	JOB	FQ81032
	CUSTOMER	DESMET BALLESTRA

SPARE PARTS

1	BAG FILTER	65F11	QUANTITY				PRICE
	DRAWING STD-RIC-BF-01		POS.	INSTALL.	1st	2 YEARS	[euro]
Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	15	1	8	
Cages [mmxmm]	152 X 2000	EL1522000FG	2	15	1	3	
Kit membrane	1 "	KM1 "	3	3	1	2	
Pilot group+spool+cover	1 "	GP1 "	4	3	1	2	
Pressure reducer		GTAC	5	1	0	1	
Economizer		ECO3	6	1	0	1	
Kit for connecting blowing pipes	Rubber	MG1 "	7	3	1	2	

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SPARE PARTS

1	BAG FILTER		62F3				
	DRAWING	STD-RIC-BF-01			QUANTITY		PRICE
	DESCRIPTION		CODE	POS.	INSTALL.	1st	2 YEARS
	Filtering bags [mmxmm]	152 X 2000	EL1522000PPNN	1	15	1	8
	Cages [mmxmm]	152 X 2000	EL1522000FG	2	15	1	3
	Kit membrane	1 "	KM1 "	3	3	1	2
	Pilot group+spool+cover	1 "	GP1 "	4	3	1	2
	Pressure reducer		GTAC	5	1	0	1
	Economizer		ECO3	6	1	0	1
	Kit for connecting blowing pipes	Rubber	MG1 "	7	3	1	2

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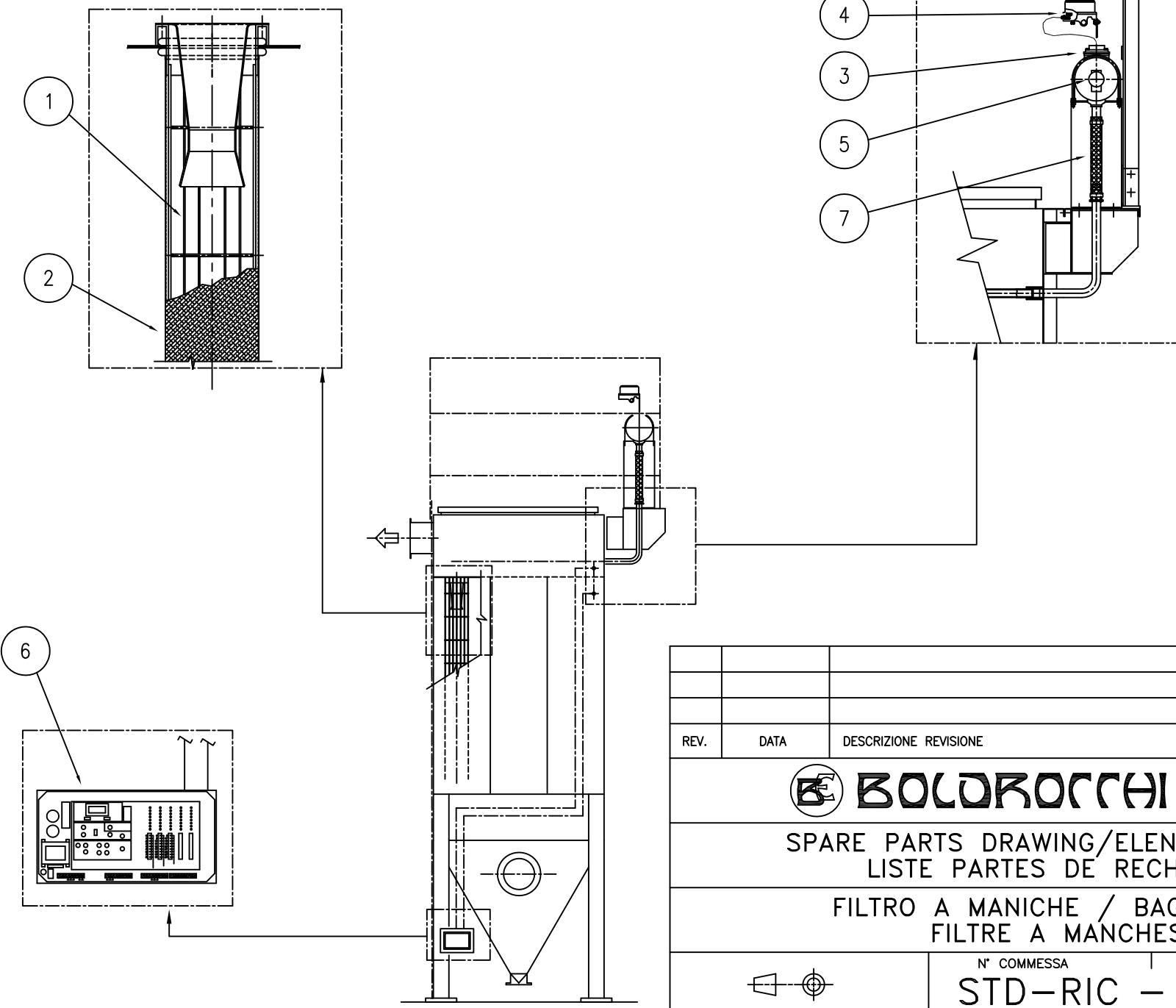
SPARE PARTS

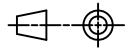
1	BAG FILTER		65F1				
	DRAWING STD-RIC-BF-01			QUANTITY			PRICE
	DESCRIPTION	CODE	POS.	INSTALL.	1st	2 YEARS	[euro]
Filtering bags [mmxmm]	152 X 3000	SR1523000PPNN	1	66	1	33	
Cages [mmxmm]	152 X 3000	SR1523000FG	2	66	2	14	
Kit membrane	1 "	KM1 "	3	6	1	3	
Pilot group+spool+cover	1 "	GP1 "	4	6	1	3	
Pressure reducer		GTAC	5	1	0	1	
Economizer		ECO6	6	1	0	1	
Kit for connecting blowing pipes	Rubber	MG1 "	7	6	1	3	

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SPARE PARTS

1	BAG FILTER		65F10	QUANTITY				PRICE	
	DRAWING STD-RIC-BF-01			CODE	POS.	INSTALL.	1st	2 YEARS	[euro]
	Filtering bags [mmxmm]	152 X 1250	EL1521250PPNN	1	9	1	5		
	Cages [mmxmm]	152 X 1250	EL1521250FG	2	9	1	2		
	Kit membrane	1 "	KM1 "	3	3	1	2		
	Pilot group+spool+cover	1 "	GP1 "	4	3	1	2		
	Pressure reducer		GTAC	5	1	0	1		
	Economizer		ECO3	6	1	0	1		
	Kit for connecting blowing pipes	Rubber	MG1 "	7	3	1	2		



REV.	DATA	DESCRIZIONE REVISIONE	DISEGNATO	CONTROLLATO	VERIFICATO
 BALDOROCCHI ECOLOGIA					
SPARE PARTS DRAWING/ELENCO RICAMBI					
LISTE PARTES DE RECHARGE					
FILTRO A MANICHE / BAG FILTER					
FILTRE A MANCHES					
		N° COMMESSA	N° DISEGNO	REVISIONE	FOGLIO
STD-RIC - BF-01 - 0		-			
IL PRESENTE DISEGNO non puo' essere riprodotto ne' trasmesso a terzi senza l'autorizzazione della SOCIETA'					



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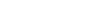
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SPARE PARTS



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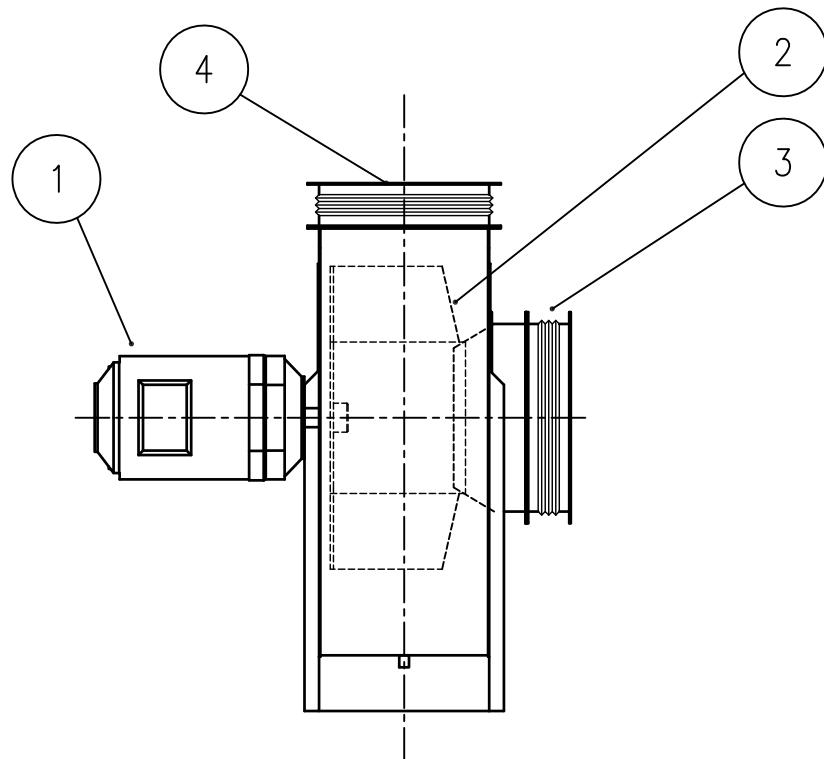
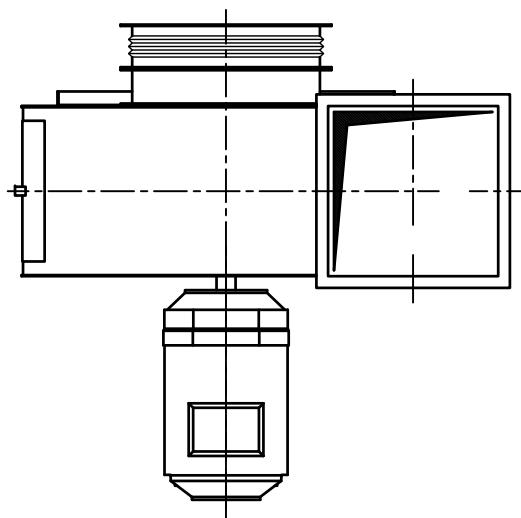
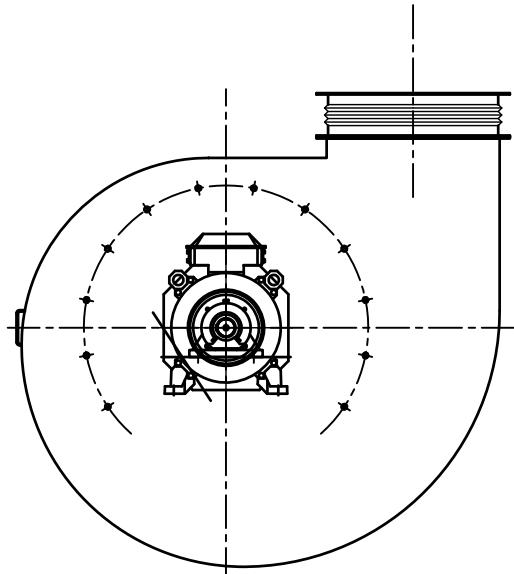
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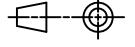
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SPARE PARTS



REV.	DATA	DESCRIZIONE REVISIONE	DISEGNATO	CONTROLLATO	VERIFICATO
 BALDOROCCHI ECOLOGIA					
SPARE PARTS DRAWING/ELENCO RICAMBI					
LISTE PARTES DE RECHANGE					
VENTILATORE / CENTRIFUGAL FAN					
VENTILATEUR					
		N° COMMESSA	N° DISEGNO	REVISIONE	FOGLIO
STD-RIC - VN-05 -		0	-		
IL PRESENTE DISEGNO non puo' essere riprodotto ne' trasmesso a terzi senza l'autorizzazione della SOCIETA'					



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4)

ELECTRICAL DRAWINGS AND SCHEMES



FULL OPTIONAL

CE

USER'S MANUAL

MAN 0004 REV. 1.1 DATE 14/05/10- MANDistr_ ECOMATIC-NET _FULL_OPTIONAL_ENG_V1_1.doc

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GENERAL DESCRIPTION

Economisers in the **ECOMATIC-NET** range are digital sequential timers with built-in differential pressure switches.

The versions **ECOMATIC4-NET**, **ECOMATIC6-NET**, **ECOMATIC12-NET**, **ECOMATIC20-NET** and **ECOMATIC32-NET** enable control of up to 4, 6, 12, 20, and 32 solenoid valves respectively. The version **ECOMATIC64-NET** is equipped with an expansion card with 32 outputs, expanding control capacity to up to 64 solenoid valves. In the same way, the model **ECOMATIC96-NET** is equipped with 2 expansion cards for capacity expansion up to 96 solenoid valves.

On all the above models, current differential pressure is shown in mmH₂O on a 3-digit display; the three keys also enable programming of parameters on the instrument according to personal requirements including, pause time, operation time, post-cleaning time (or number of cycles) and washing start and end pressure, post-cleaning pressure, alarm pressure and operation mode (automatic/manual).

All models are equipped with LEDs to display activation of outputs, pause phases and power on, the power supply presence, the post-cleaning status, and so on and so on.

All standard models of economiser are designed with AC solenoid valve outputs; the output stage comprises triacs with *zero-crossing* activation/deactivation to reduce disturbance. Versions are available on request with transistor type output stages for solenoid valves with 24 V dc operating voltage.

Each model is supplied in polycarbonate enclosures with transparent lids and **IP56** protection rating.

ECOMATIC-NET, properly connected to the dust meter GDM-1, SDM-1, or simply to a dust detector probe RP02, is able to detect the broken bags, showing the line where the damage is occurred.

With appropriate forms, ECOMATIC-NET instruments can:

- can be provided of an analogical output proportional to the pressure read by the sensor. The pressure interval allowed is programmable through two parameters: "P32" e "P33";
- can be provided of a serial output to monitor the working situation, the pressure and the command of the unit. For sending or reading parameters from the ECOMATIC-NET is possible to use the expansion board for the serial communication RS485.

The serial output RS485 with Modbus protocol is used as a communication data line (reading and writing) between PC/PLC and ECOMATIC-NET and eventually other units for the data registration. For the data exchange with the PC, ECOMATIC-NET needs an interface module RS 232 / RS 485 half duplex to be able to convert the signal logical levels. For further information look at the section "**PROTOCOL SERIAL COMMUNICATION BOARD RS485**"

Note: with the models ECOMATIC4-NET and ECOMATIC6-NET is possible to have the analogical output or the serial output, not both of them.

GENERAL TECHNICAL FEATURES

Voltage:	24 Vac, 115 Vac, 230 Vac +/- 15%, 50-60Hz. Optional is available a DC voltage between 22Vdc 34V.
Fuse:	F2 = general fuse 2A 5x20 rapid F4 = electrovalves power supply fuse 1.6A 5x20 delayed
Working temperature:	-10 / +50 °C;
Connection:	Through screw terminals boards
Max Adsorbe Power:	100VA.
Input Ecomatic-net 4/6:	n° 3 inputs opto-isolated
Input Ecomatic-net 12/20/32/64/96:	n° 4 inputs opto-isolated
Relay Output Ecomatic-net 4/6:	n° 1 relay 2A resistant load 115Vac
Relay Output Ecomatic12-net :	n° 2 relay 2A resistant load 115Vac
Relay Output Ecomatic-net 20/32/64/96:	n° 4 relay 2A resistant load 115Vac
Electrovalves Output:	output triac with activation/deactivation <i>zero-crossing</i> 24, 115 o 230 Vac with max current 2°. A transistor for the versions available for the electrovalves driving at 24 Vdc (optional).

TECHNICAL FEATURES TIMER

Standard Pause Times:	Duration: 1- 999 sec;	Precision: 0,1 sec;
Standard Working Times:	Duration: 0.03 - 9.99 sec;	Precision: 0,01 sec;
Post Cleaning Times:	Duration: 1 - 999 sec;	Precision: 0,1 sec;

TECHNICAL FEATURES ANALOG OUTPUT (optional)

CURRENT OUTPUT

Visualization range:	From 4.0 to +20.0 mA (standard) / From 0.0 to +20.0 mA (optional)
Precision:	+/- 0.1 mA, +/- 1 digit.
Maximum load allowed:	500 Ohm

VOLTAGE OUTPUT

Visualization range:	From 0.0 to +5.0 V (optional) / From 0.0 to +10.0 V (optional)
Precision:	+/- 0.1 V, +/- 1 digit.
Minimum load allowed:	1K Ohm

TECHNICAL FEATURES RS485 SERIAL COMMUNICATION (optional)

Possible baud rate:	4800-9600-19200. (standard 9600)
Command's answer time:	15ms.
Possible operations:	single reading (code 03) – single writing (code 06).
Hardware:	RS485 half duplex.
Protocol:	MODBUS-RTU

DIMENSION AND FEATURES BOX ECOMATIC12-NET

ECOMATIC-NET is enclosed inside a box with IP56 protection rating.



ECOMATIC-NET 4/6

<u>Internal Dim. BxHxP (mm)</u>	190 x 140 x 70
<u>Ø max allowed holes</u>	37 mm
<u>Top screws (n. and type)</u>	4 isol. Zipper pouncable

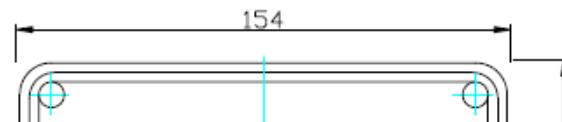
ECOMATIC12-NET

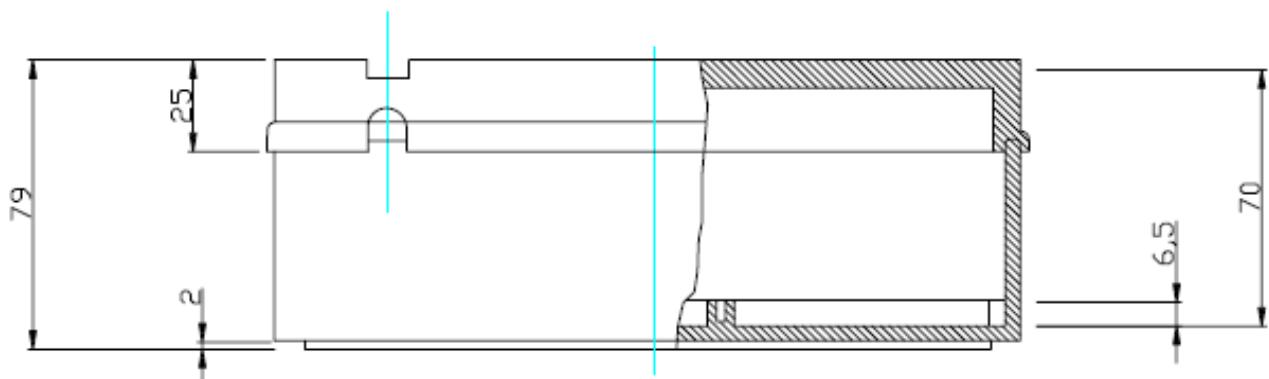
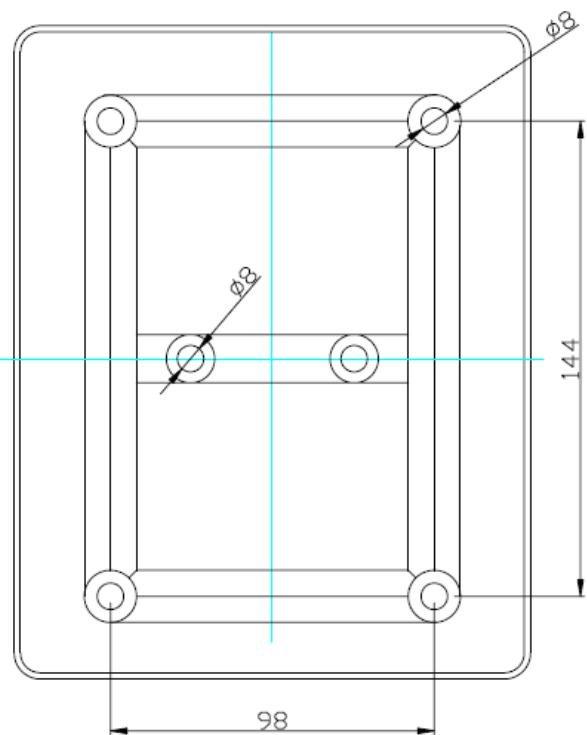
<u>Internal Dim. BxHxP (mm)</u>	240 x 190 x 90
<u>Ø max allowed holes</u>	37 mm
<u>Top screws (n. and type)</u>	4 isol. Zipper pouncable

ECOMATIC-NET 20/32/64/96

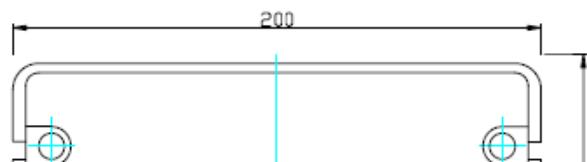
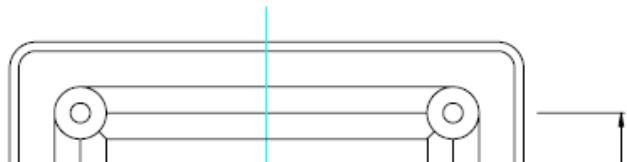
<u>Internal Dim. BxHxP (mm)</u>	380 x 300 x 120
<u>Ø max allowed holes</u>	48 mm
<u>Top screws (n. and type)</u>	4 isol. Zipper pouncable

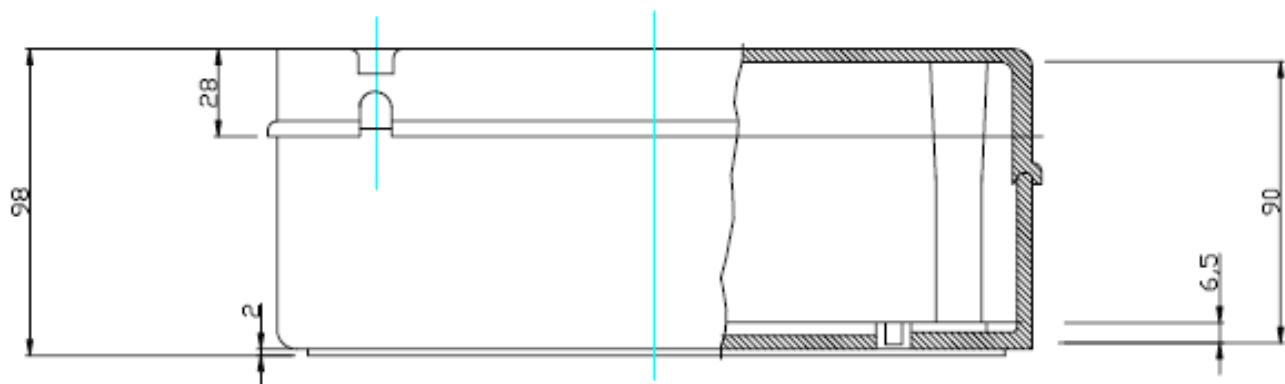
BOX DIMENSION ECOMATIC-NET 4/6





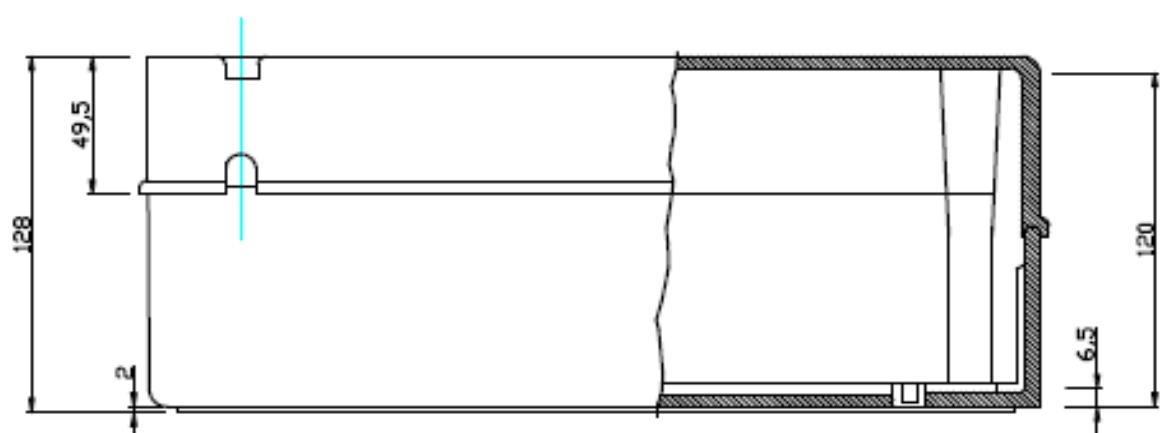
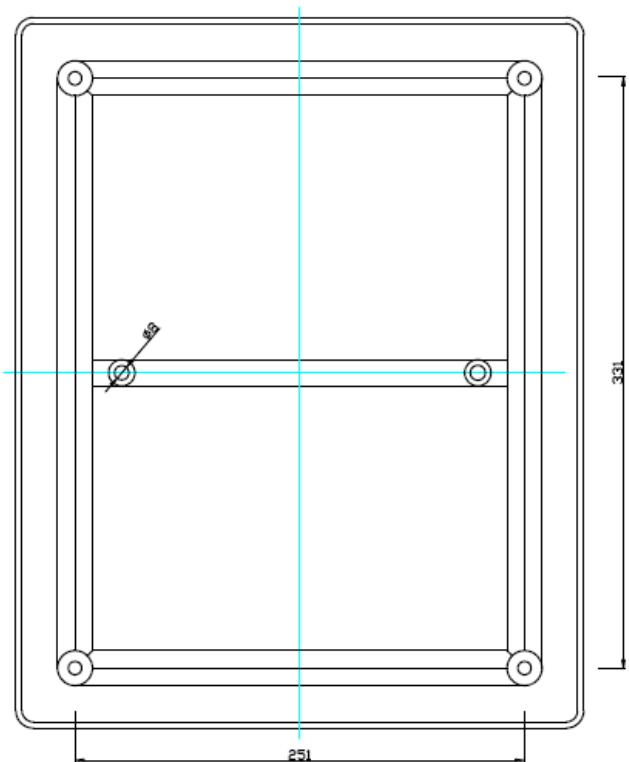
BOX DIMENSION ECOMATIC12-NET





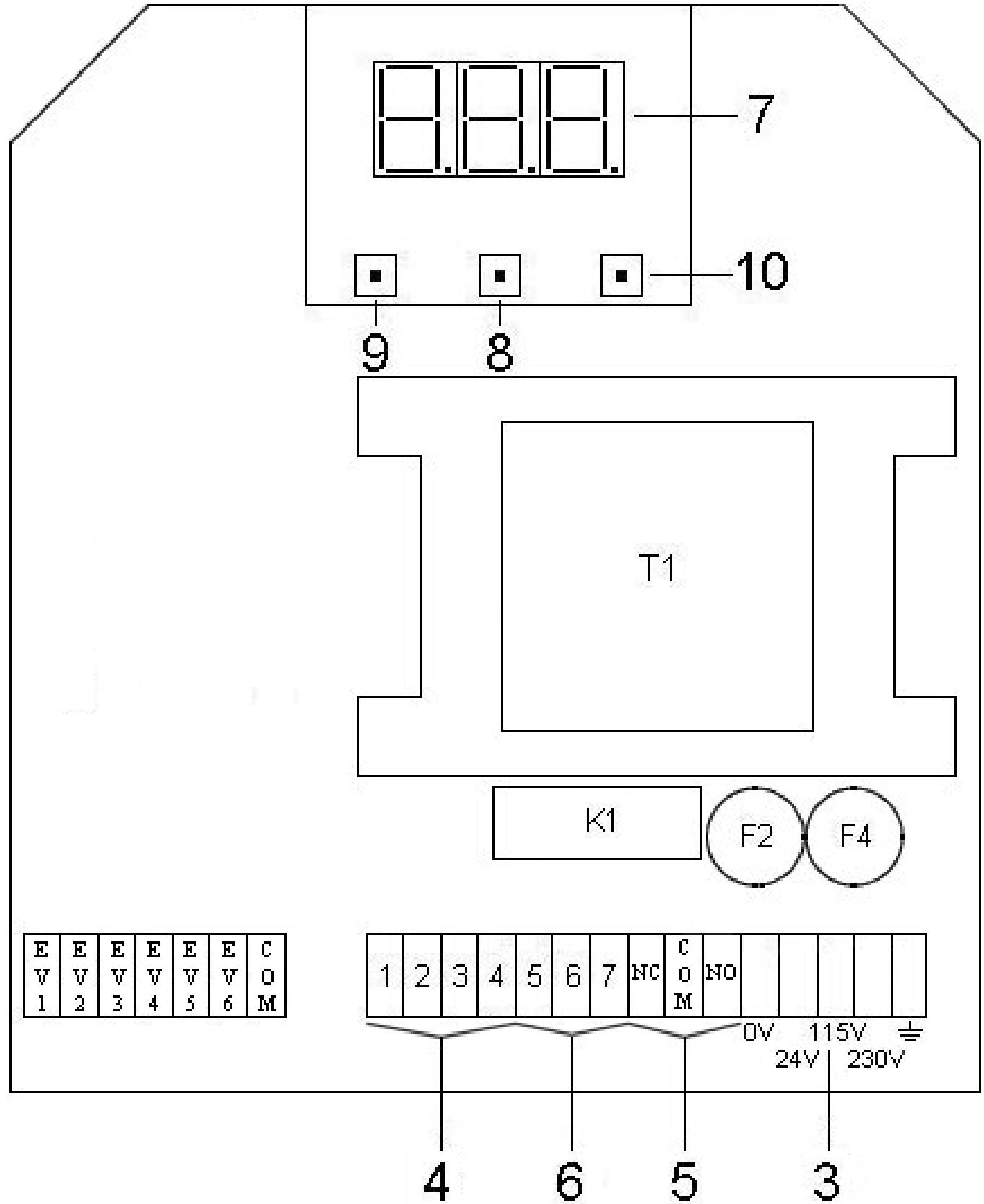
BOX DIMENSION ECOMATIC-NET 20/32/64/96





LAYOUT – LEGEND BOARD ECOMATIC-NET

LAYOUT ECOMATIC-NET 4/6



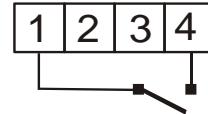
1 - F2, Power supply protection fuse.

2 - F4, Electrovalves protection fuse.

3 – Power supply terminals**4 – Input Contacts terminals****Terminals 1, 4: Input Contact n°1;**

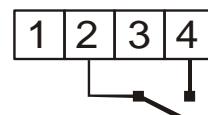
Open contact: no-activated input;

Closed contact: activated input;

**Terminals 2, 4: Input Contact n°2;**

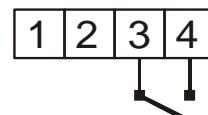
Open contact: no-activated input;

Closed contact: activated input;

**Terminals 3, 4: Input Contact n°3;**

Open contact: no-activated input;

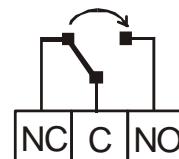
Closed contact: activated input;

**5 – Relay output terminals:****Terminals NC,COM,NO: Relay contact 1 (K1);**

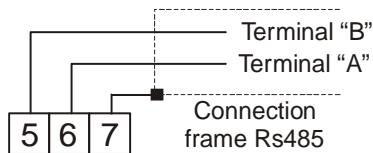
Terminals NC: Contact N.C.

Terminals COM: Common.

Terminals NO: Contact N.O.

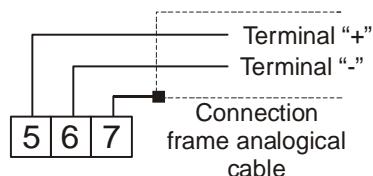
**6 – Auxiliary outputs terminals (optional, used with expansion boards):****Terminals 5,6,7: in case of terminals for expansion board RS 485;**

- Terminal 5:** terminal B for serial board RS 485;
Terminal 6: terminal A for serial board RS 485;
Terminal 7: connection frame RS 485 (optional, but advised);



Terminals 5,6,7: in case of terminals for expansion board 4-20mA;

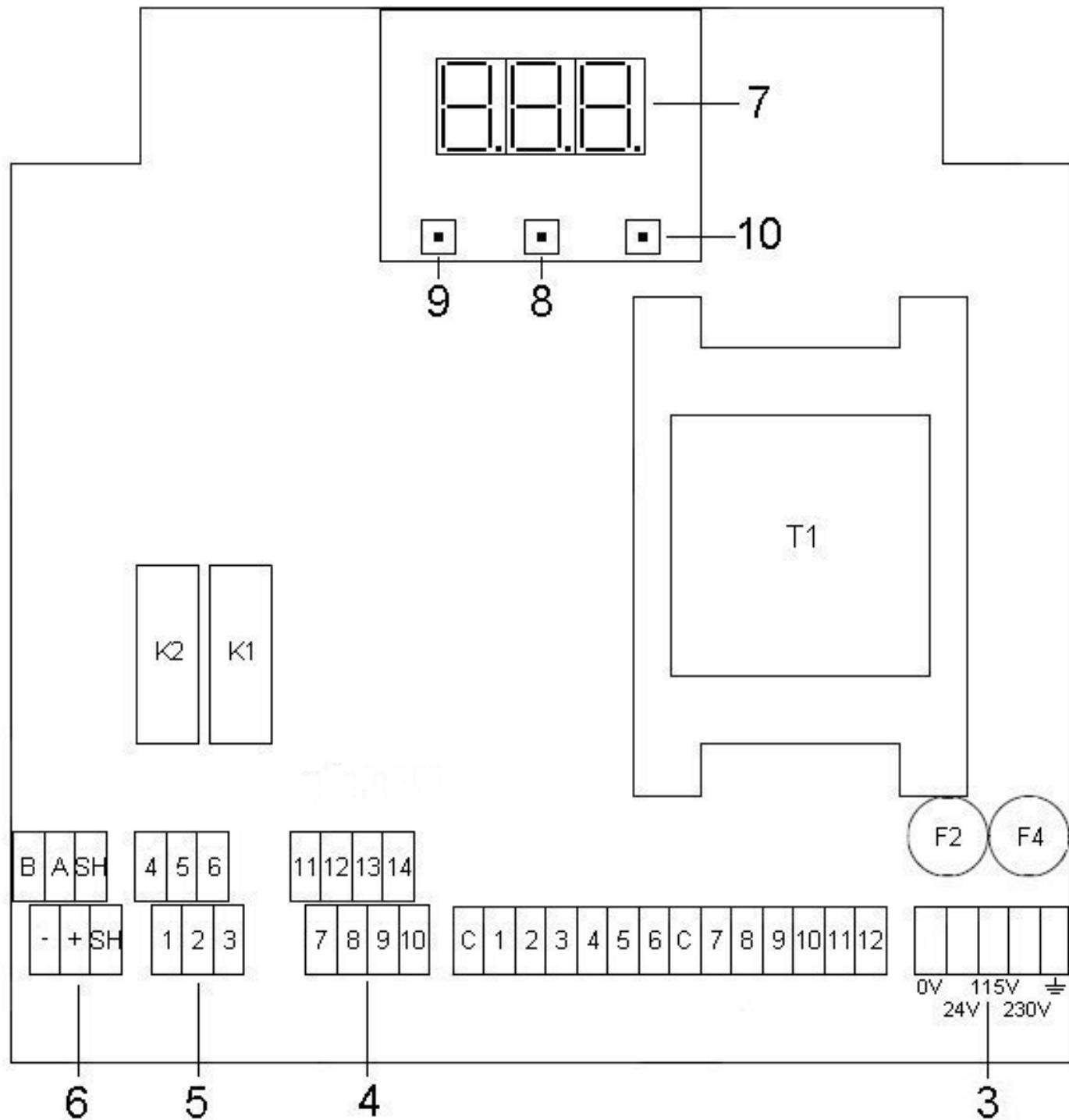
- Terminal 5:** terminal B for serial board RS 485;
Terminal 6: terminal A for serial board RS 485;
Terminal 7: connection frame RS 485 (optional, but advised);



7 - Display 7 Segments 3 DIGIT;

- 8 - Enter Key** (E);
9 - Decrease Key (↓);
10 - Increase Key (↑);

LAYOUT ECOMATIC12-NET



1 - F2, Power supply protection fuse.

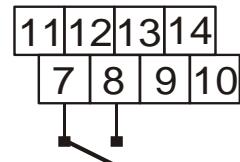
2 - F4, Electrovalves protection fuse.

3 – Power supply terminals

4 – Input Contacts terminals

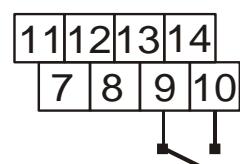
Terminals 7, 8: Input Contact n°1:

Open contact: no-activated input;
Closed contact: activated input;



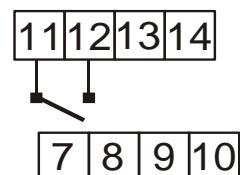
Terminals 9, 10: Input Contact n°2:

Open contact: no-activated input;
Closed contact: activated input;



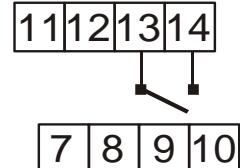
Terminals 11, 12: Input Contact n°3:

Open contact: no-activated input;
Closed contact: activated input;



Terminals 13, 14: Input Contact n°4:

Open contact: no-activated input;
Closed contact: activated input;



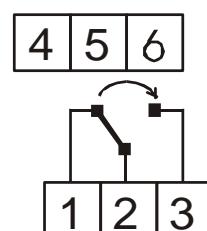
5 – Relay output terminals:

Terminals 1,2,3: Relay contact 2 (K1);

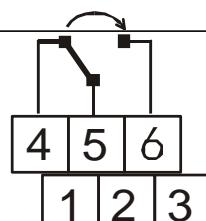
Terminals 1: Contact N.C.

Terminals 2: Common.

Terminals 3: Contact N.O.



Terminals 4,5,6: Relay Contact 1 (K2);



Terminal 4: Contact N.C.

Terminal 5: Common.

Terminal 6: Contact N.O.

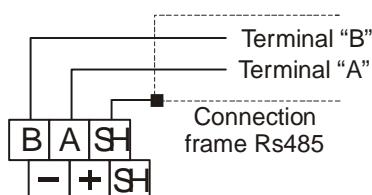
6 – Auxiliary outputs terminals (optional, used with expansion boards):

Terminals B,A,SH: Terminals for expansion board RS 485;

Terminal B: terminal B for serial board RS 485;

Terminal A: terminal A for serial board RS 485;

Terminal SH: connection frame RS 485 (optional, but advised);

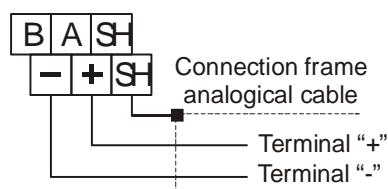


Terminals -,+ , SH: Terminals for expansion board analogical output;

Terminal -: negative terminal for analogical output board;

Terminal +: positive terminal for analogical output board;

earth Terminal: connection frame analogical cable (optional, but advised);



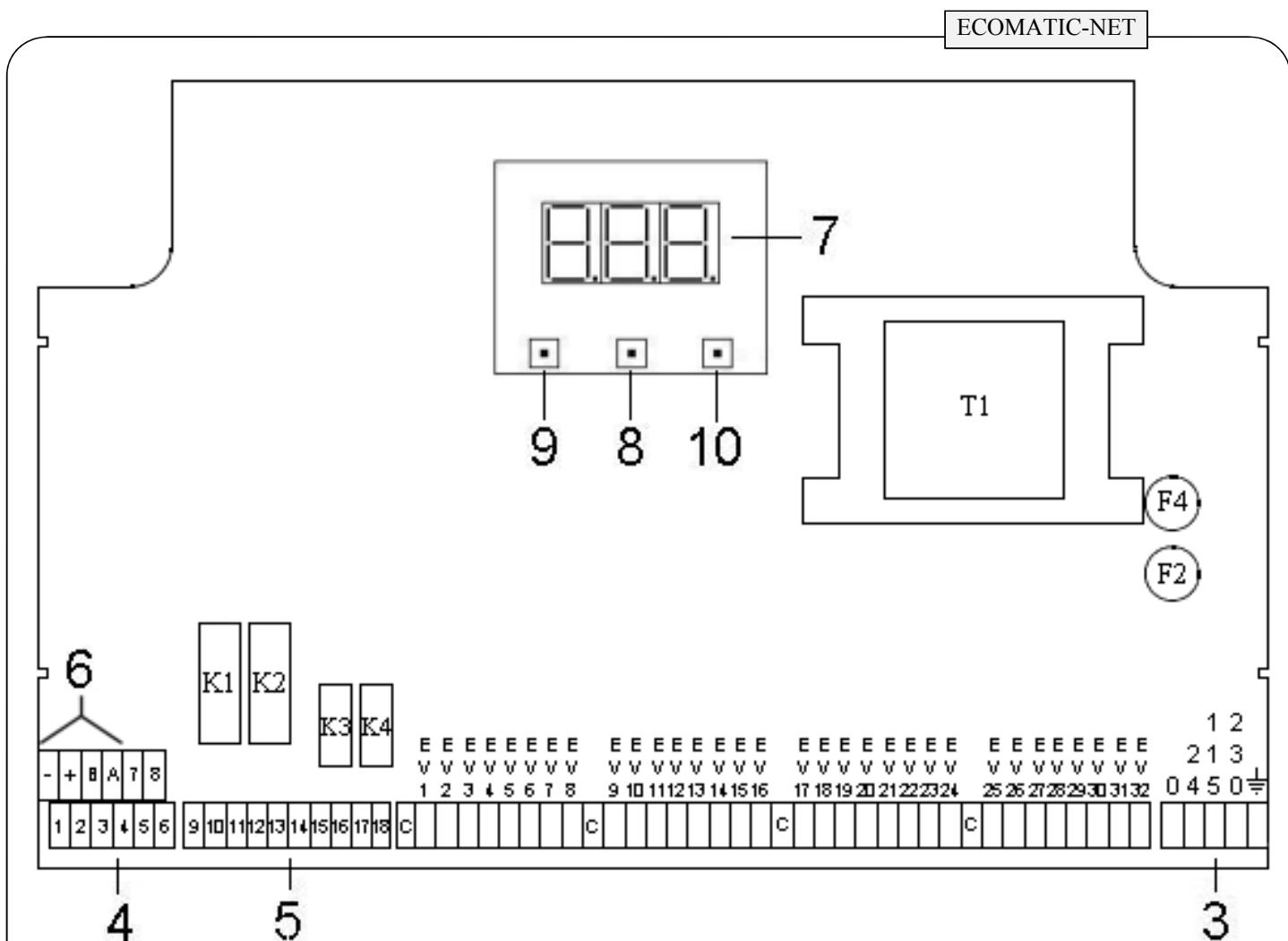
7 - Display 7 Segments 3 DIGIT;

8 - Enter Key (E);

9 - Decrease Key (↓);

10 - Increase Key (↑);

LAYOUT ECOMATIC-NET 20/32/64/96



1 - F2, Power supply protection fuse.

2 - F4, Electrovalves protection fuse.

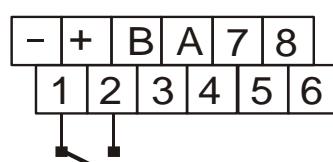
3 – Power supply terminals

4 – Input Contacts terminals:

Terminals 1, 2: Input Contact n°1;

Open contact: no-activated input;

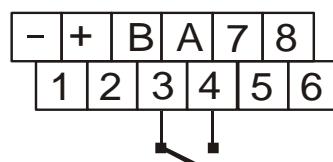
Closed contact: activated input;



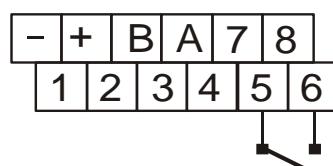
Terminals 3, 4: Input Contact n°2;

Open contact: no-activated input;

Closed contact: activated input;



Terminals 5, 6: Input Contact n°3;



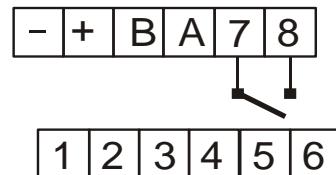
Open contact: no-activated input;

Closed contact: activated input;

Terminals 7, 8: Input Contact n°4:

Open contact: no-activated input;

Closed contact: activated input;



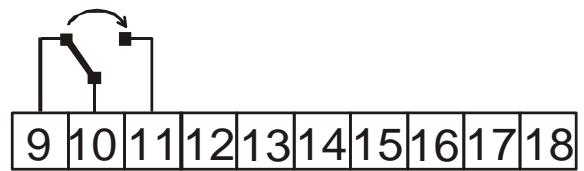
5 - Relay output terminals:

Terminals 9,10,11: Relay contact 1 (K1):

Terminals 9: Contact N.C.

Terminals 10: Common.

Terminals 11: Contact N.O.

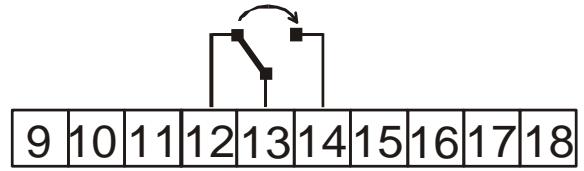


Terminals 12,13,14: Relay contact 2 (K2):

Terminals 12: Contact N.C.

Terminals 13: Common.

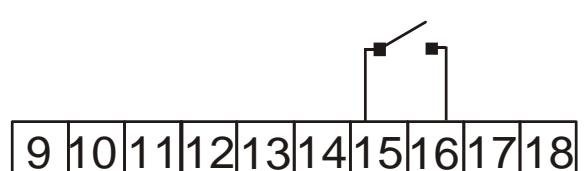
Terminals 14: Contact N.O.



Terminals 15,16: Relay contact 3 (K3):

Terminals 15: Contact N.O.

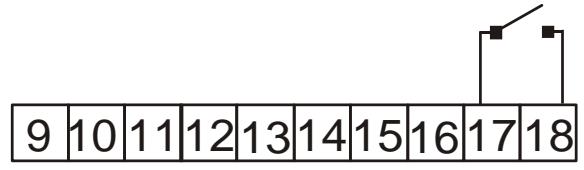
Terminals 16: Common.



Terminals 17,18: Relay contact 4 (K4):

Terminals 17: Contact N.O.

Terminals 18: Common.

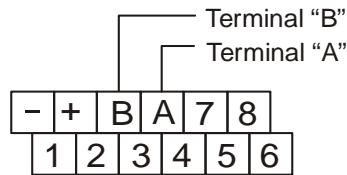


6 - Auxiliary outputs terminals (optional, used with expansion boards):

Terminals B,A: Terminals for expansion board RS 485;

Terminal B: terminal B for serial board RS 485;

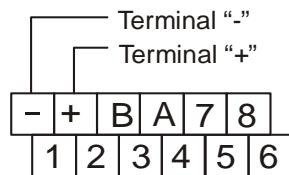
Terminal A: terminal A for serial board RS 485;



Terminals -,+, SH: Terminals for expansion board analogical output;

Terminal -: negative terminal for analogical output board;

Terminal +: positive terminal for analogical output board;



7 - Display 7 Segments 3 DIGIT;

8 - Enter Key (E);

9 - Decrease Key (↓);

10 - Increase Key (↑);

The reading range of the pressure has various possibilities and it has to be specified in the purchase order phase in order to satisfy the customer needs. Here following are shown the maximum range of reading pressure for each kind of these instruments.

ECOMATIC-NET type A (standard):

Full scale :	From -99 to +999 mmH ₂ O On request other scales (mbar, kpa, pascal).
Precision:	+/- 1% F.S. , +/- 1 digit.

ECOMATIC-NET type B:

Full scale :	From -9,9 to +99,9 mmH ₂ O On request other scales (mbar, kpa, pascal).
Precision:	+/- 1% F.S. , +/- 1 digit.

ECOMATIC-NET Type C:

Full scale:	From -0,99 to +9,99 mmH ₂ O On request other scales (mbar, kpa).
Precision:	+/- 1% F.S. , +/- 1 digit.

Conversion Chart per Measurement units of pressure.

Equal to →	mmH₂O	pascal	mbar	kpascal	mmHg
mmH₂O	1	9.8064	0.098064	0.0098064	0.07355592
pascal	0.101974	1	0.01	0.001	0.007500617
mbar	10.1974	100	1	0.1	0.7500617
kpascal	101.974	1000	10	1	7.500617
mmHg	13.5951	133.3224	1.333224	0.1333224	1

All the ECOMATIC-NET models can have as power supply 3 different tensions 24 Vac, 115 Vac e 230 Vac. Optionally it is available the power supply 24 VDC too.

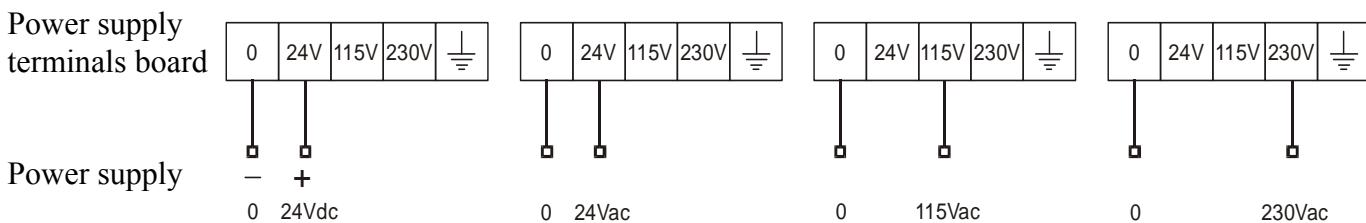


CAUTION
Ensure that the power supply is disconnected before making or modifying cable connections.



The power supply has to be connected in this way (according to the chosen power supply).

ECOMATIC-NET 4/6/12/20/32/64/96



note

- The power supply has to be *sectioned upstream* of the equipment;
- Both for the *economizers* and the *electrovalves* has to be done the earth connection;
- You have to use shielded cable, far from noise sources, like Inverter power cables and engines in general;

ELECTROVALVES CONNECTION SCHEME

The solenoid valves are connected between output terminals 1 - ... - N and terminal C (common) which is connected to a suitable power supply via an external connection.

ECOMATIC-NET 12/20/32/64/96 models are equipped with more than one common terminal: obviously they are all interconnected and therefore *do not require* additional external connections.

According to the power supply given to the unit it is possible to use some types of electrovalves. Here following the options:

- **24 Vac power supply:** solenoid valves can be connected to **24 Vac**, or **24 Vdc** power supply (**24 Vdc** = option to request at time of order).
- **115 Vac power supply:** solenoid valves can be connected to **24 Vac**, **115 Vac** or **24 Vdc** power supply (**24 Vdc** = option to request at time of order).
- **230 Vac power supply:** solenoid valves can be connected to **24 Vac**, **115 Vac**, **230 Vac** or **24 Vdc** power supply (**24 Vdc** = option to request at time of order).
- **24 Vdc power supply:** solenoid valves can be connected to **24 Vdc** power supply *only*.

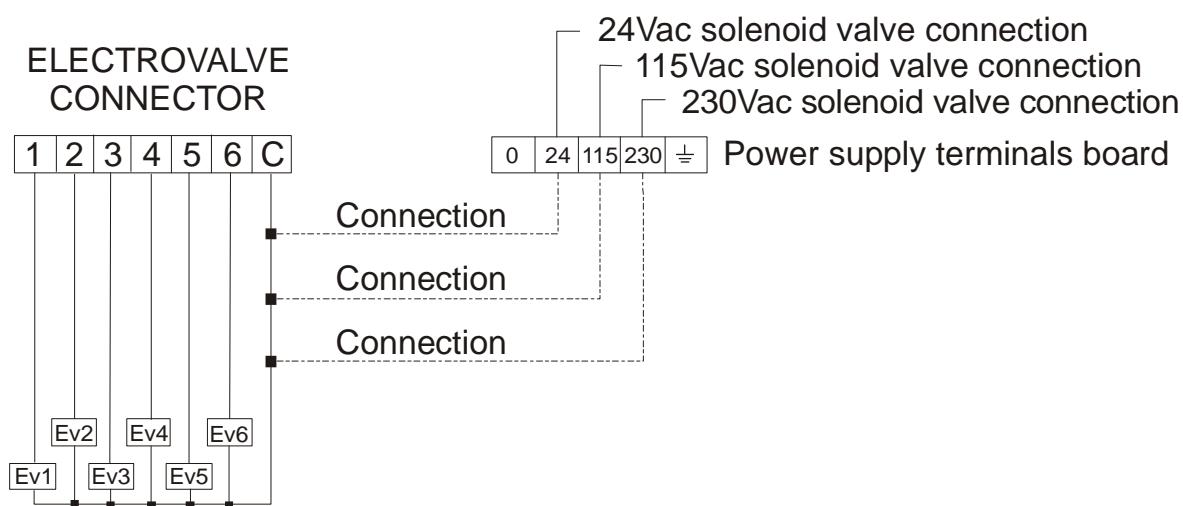
As we can see in the case of electrovalves in **DC** it is necessary to indicate it at the purchase order phase in order to adapt the circuit at this kind of output.

For the load connection has to be done a external bridge (do the connection between the **terminal C** (common), and the **power supply terminal**, corresponding to the power supply of the electrovalves). *If you forget to do this connection the electrovalve will not be driven : the unit will activate all the outputs quickly (the LEDs on the outputs will be switched on for a short time, and the pause LED will quickly blink) without activating any electrovalve.*

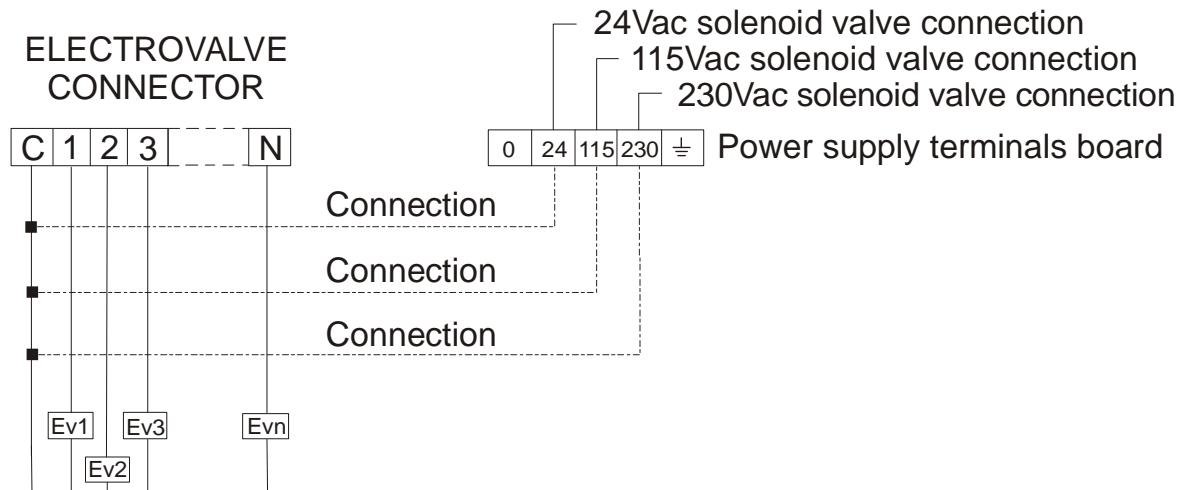
N.B. : In the case of electrovalves **DC**, the connection bridge for the power supply of the load has not to be done.

The following pictures show the different kinds of connection that have to be made according to the working voltage of the electrovalves.

ECOMATIC-NET 4/6



ECOMATIC-NET 12/20/32/64/96



Control of electrovalves in series on a single output or multiple shot on more then one output.

ECOMATIC-NET cards are able to control up to 2 Electrovalves for a single output, or to activate up to 4 outputs at the same time for tensions 110V/220V and 2 outputs at the same time for tensions 24VAC/DC.

ATTENTION: to activate more then one electrovalve in series or on various outputs, you need to have *the same* tension for valves power supply and instrument power supply. In this way, the requested power is supplied by the supply net (e.i. instrument power supply 230VAC and coils 230VAC). In case you are using the filter configuration ON-Line and OFF-Line, also the valves for opening/closing must have the same power supply of the cleaning valves and of instrument power supply.

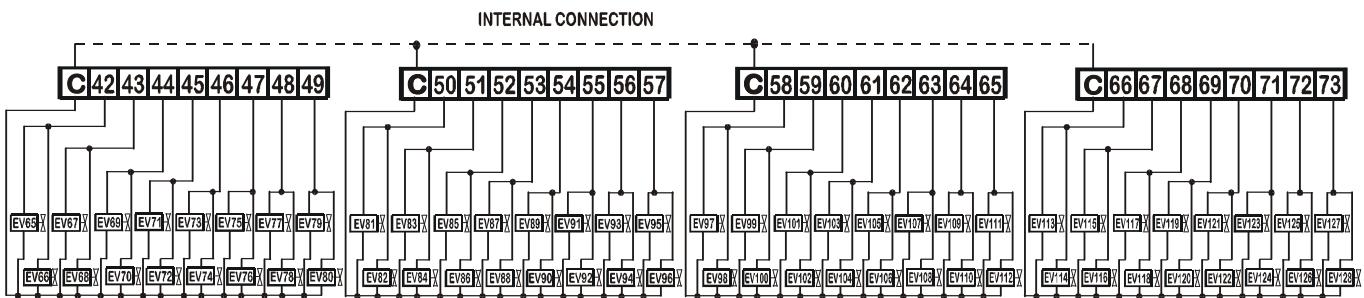
CAUTION

In all the models of ECOMATIC-NET, in the case you have to drive two electrovalves at the same time, the value of two fuses on the board has to be changed:

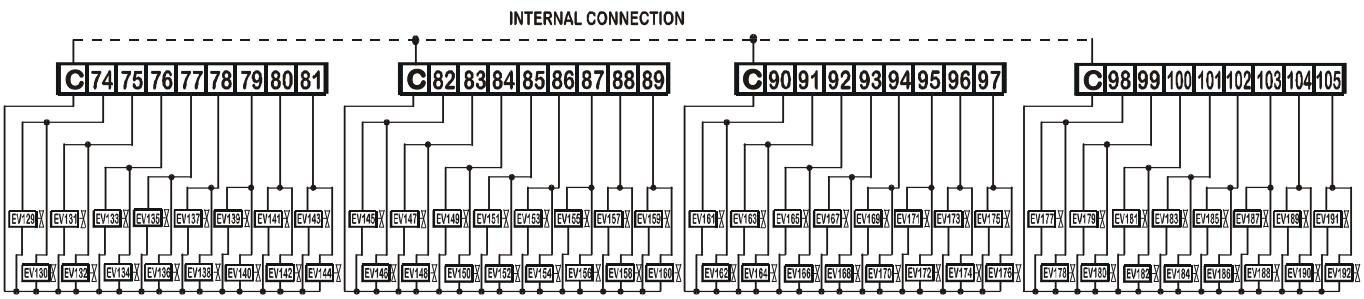
- the one for general protection of 2A quick has to be changed into 4A quick and the one for load protection of 1.6A delayed has to be changed into 3.15A delayed.

In particular, in the versions ECOMATIC-NET 64/96, the connection of the double electrovalves to the outputs on the expansions has to be done according to the following scheme:

1st expansion (both ECOMATIC64-NET and ECOMATIC96-NET)



2nd expansion (just in the ECOMATIC96-NET)



note: For connecting the load of the double electrovalves on the *expansions* (ECOMATIC-NET 64/96) it is necessary to do one *connection* between the terminal C (common) of the expansion board, and the terminal C of the ECOMATIC32-NET board.

note

- we suggest you to put the cables of electrovalves far from noise sources, like inverter power cables and engines in general;

DISPLAY VISUALIZATION

Through the display you can see different information of the system, regarding pressure, output number or cleaning command, cycle status and value of analogical output.

There are 2 or 3 visualization menu (3 if the analogical output is enabled) selected through the button **Inc** (↑) or **Dec** (↓). The three menu are divided as follows:

The 1° menu identifies the pressure value read by the instrument;

- visualization: “**Pr.**”

The 2° menu identifies the system status, the output number or cleaning command, and the command for cell opening or closing;

- if the system is in **STOP** or almost in stop, you will see: “**S.xx**”
- if the system is in **CLEANING**, you will see: “**U.xx**” (if it corresponds to the output)
“**C.xx**” (if it corresponds to the output)
- if the system is in **POSTCLEANING**, you will see: “**P.xx**”

In all these status of the system, on the part **xx** you can view the following wordings:

- **number n°** (if it is an output or command for cleaning valve)
- **OP** (if it is a valve for cell opening)
- **CL** (if it is a valve for cell closing)
- **SC** (during the cycle start-up)

The 3° menu (if enabled) identifies the value of the analogical output

- visualization: “**Cor.**” (if the output is in current)
- visualization: “**Vol.**” (if the output is in tension)

ALARMS VISUALIZATION

In ECOMATIC-NET there are different types of alarms, you find the indications here under:

- 1) **Triboelectrical Alarm**: in case of triboelectrical alarm, display will show the flashing alarm code “**E n**” (if P38=0, where “n” is the number of output where the alarm has been detected) or the flashing alarm code “**F n**” (if P38≠0, where “n” is the cleaning command where the alarm has been detected).
- 2) **Load Alarm**: in case of load alarm, display will show the flashing alarm code “**H n**” (if P38=0, where “n” is the number of output where the alarm has been detected) or the flashing alarm code “**L n**” (if P38≠0, where “n” is the cleaning command where the alarm has been detected).
- 3) **Tank Pressure switch Alarm**: in case of alarm of tank pressure switch, display will show the flashing alarm code “**A 1**”.

N.B.1: alarm 1 (if **P 28=0**) has an automatic reset in case of the condition come back to the established limits.

N.B.2: With the buttons **Inc** (↑) and **Dec** (↓), pressing at the same time for 1 second in the pressure visualization, it is possible to reset all the alarms.

ERRORS VISUALIZATION

PRESSURE ERROR

When the instrument visualizes the pressure value, two indications of *out of range* are foreseen: if the input differential pressure is higher than the positive full scale set, the display will visualize the indication ‘**EEE**’.

In the case the pressure would be lower than the negative full scale set, the display will visualize the indication ‘**-EE**’.

E2PROM ERROR

In the case we will have problems with the configuration of the E2prom, the instrument will visualize on the display the indication “---” to show the loss of programming and setting data.

Pressing the key **Dec** (↓) the normal function of the instrument will be reloaded as well as the default data, although it will be necessary to do once more the setting and programming phase by qualified people in the company.

PRELIMINARY PROCEDURES

At the ignition, the unit will be ready for the visualization of the differential pressure value read by the internal sensor.

With the button **Inc** (↑) or **Dec** (↓) you can look through the visualizations of the pressure, the number of valve in cleaning and of the value in analogical output (if enabled).

To enter in the configuration or programming menu is enough to press the key **E**: it will appear on the display the blinking indication **H 00**, which shows the password insertion to have access to the menu.

The configuration menu has a unique structure, but the programming menu has two structures:

-1 quick access menu without password (all values allowed as a password) for programming parameters from P1 to P6;

-2 access menu with password (password value 7), for programming all the parameters;

The configuration menu has as a password the value **29**

N.B. Please pay attention to this menu because it is where the proper function of the board comes from.

Once the password has been inserted, pressing continuously the key **Inc** or **Dec**, it will be possible to look at one by one all the parameters.

To exit from the configuration menu, press keys **Inc** and **Dec** at the same time.

The exit from the programming menu is automatic after 10 seconds when you do not press any key during the parameters scrolling.

PROGRAMMATION PARAMETERS

The following table shows all the available *parameters*, explaining the *function* and the admissible range of *values*.

Parameter Eco		Function	Possible values	Further informations
E11=0	E11=1			
L1	L1	Hourcounter.	0 - 65534 hours	Hourcounter functioning
L2	L2	Cyclecounter	0 - 65534 cycles	Cyclecounter functioning
P1	P7	Functioning modality	0 – 24	Ecomatic-net functioning
P2	P1	Automatic pause time or maximum pause Autopause	1 – 999 seconds or minutes	Automatic and Autopause functioning
P3	P16	Manual pause time or minimum pause Autopause	1 – 999 seconds or minutes	
P4	P2	Working time.	0.03 – 9.99 seconds 0.3 – 99.9 seconds 3 – 999 seconds 30 – 9990 seconds	Work time table
P5	P8	Start cleaning pressure or maximum pressure Autopause	From 0 to F.S. positive	Automatic and Autopause functioning
P6	P9	End cleaning pressure or minimum pressure Autopause.	From 0 to F.S. positive	
P7	P4	Postcleaning function.	0=Disabled 1=Internal 2=External	Postcleaning functioning
P8	P6	Postcleaning time or cycles selection.	0= Time 1= Cycles	
P9	P3	Value of time or cycles.	1 – 999 seconds 1 – 999 cycles	
P10	P10	Internal postcleaning pressure threshold	Da 0 al F.S. positivo	
P11	P5	Postcleaning pause time	1 – 999 secondi o minuti	Postcleaning functioning Work time table
P12	P17	Postcleaning working time	0.03 – 9.99 secondi 0.3 – 99.9 secondi 3 – 999 secondi 30 – 9990 secondi	
P13	P11	Relay 1 pressure threshold	From 0 to F.S. positive	Relay Output functioning
P14	P18	Relay 1 functioning selection.	0 – 15	

Parameter Eco		Function	Possible values	Further informations
E11=0	E11=1			
P15	P19	Function of relay 1.	0=Normal 1=Hysteresis pressure 2=Temporized	Relay Output functioning

Parameter Eco		Function	Possible values	Further informations
E11=0	E11=1			
P16	P20	Value of relay 1 function.	From 1 to F.S. positive or from 1 – 999 seconds	Relay Output functioning Note: Not present in ECOMATI-NET 4/6 models
P17	P21	Relay 2 pressure threshold	From 0 to F.S. positive	
P18	P22	Relay 2 functioning selection.	0 – 15	
P19	P23	Function of relay 2.	0=Normal 1=Hysteresis pressure 2=Temporized	
P20	P24	Value of relay 2 function.	From 1 to F.S. positive or from 1 – 999 seconds	
P21	P12	Enable precoating.	0=Disabled 1=Enabled	
P22	P13	Precoating threshold	From 0 to F.S. positive	
P23	P25	Hourcounter functionality	0=always enabled 1=pressure threshold 2=cleaning phase	
P24	P26	Hourcounter pressure threshold	From 0 to F.S. positive	
P25	P27	Number of repetitive shots for each output.	1 – 10 shot	
P26	P28	Pause time among consecutive shots	1 – 999 seconds or minutes	Repetitive shots functioning
P27	P29	Time of tribo alarm detection	0= Disabled 1 – 999 seconds	
P28	P30	Max number of valve to jump with tribo alarm	0=No jump 1 – 10 jumps	
P29	P31	ID device for RS485	1 – 254	RS485 serial communication
P30	P32	RS485 baud rate setting	0 = 4200 1 = 9600 2 = 19200	
P31	P33	Parity bit setting	0 = None 1 = Even 2 = Odd	
P32	P14	Value of pressure responding to the minimum value of the analog output	From 0 to F.S. positive	
P33	P15	Value of pressure responding to the maximum value of the analog output	From 0 to F.S. positive	Analog output functioning
P34	P34	Pause time from external contact	1 – 999 seconds	
P35	P35	Alarm time of tank's manostat	0= Disabled 1 – 999 seconds	

Parameter Eco		Function	Possible values	Further informations
E11=0	E11=1			
P36	P36	Tank's manostat threshold with serial	1 – 999 Kpa	
P37	P37	Number of valves or command in cleaning mode	1 – Command $^{\circ}n$ or 1 – Command $^{\circ}n-1$	Functioning of number or command cleaning EV
P38	P38	Ev command modality	0 – 6	Ev command modality
P39	P39	Excitation valve time for cell opening/closing	0.50 – 9.99 seconds	ON-LINE/OFF-LINE Functioning
P40	P40	Time before cleaning cell	1 – 999 seconds	
P41	P41	Time before opening cell	1 – 999 seconds	
P42	P42	Time before start cycle	1 – 999 seconds	
P43	P43	Relay 3 pressure threshold	From 0 to F.S. positive	Relay Output functioning Note: Not present in ECOMATI-NET 4/6/12 models
P44	P44	Relay 3 functioning selection.	0 – 15	
P45	P45	Function of relay 3.	0=Normal 1=Hysteresis pressure 2=Temporized	
P46	P46	Value of relay 3 function.	From 1 to F.S. positive or from 1 – 999 seconds	
P47	P47	Relay 4 pressure threshold	From 0 to F.S. positive	Relay Output functioning Note: Not present in ECOMATI-NET 4/6/12 models
P48	P48	Relay 4 functioning selection.	0 – 15	
P49	P49	Function of relay 4.	0=Normal 1=Hysteresis pressure 2=Temporized	
P50	P50	Value of relay 4 function.	From 1 to F.S. positive or from 1 – 999 seconds	
H0	H0	Pressure zero	To be done by specialized staff <i>only if</i> the pressure with open air vents is appreciably different from zero.	

CONFIGURATION PARAMETERS

The following table shows all the available *parameters*, explaining the *function* and the admissible range of *values*.

Parameter	Function	Possible values	Further informations
E0	Pause time unit	0= Seconds 1= Minutes	-
E1+E2	Working time scale	See table	Working time table
E3	Activation of automatic load recognition	0= Disabled 1= Enabled	-
E4	Start of the cleaning cycle modality	0= Pause Phase 1= Working Phase	-
E5	Activation of load control functioning	0= Disabled 1= Enabled	Load control functioning
E6	Activation of cleaning cycle end type	0= EV Current 1= Fine Cell	Cycle end functioning
E7	Activation of the optional analog output	0= Disabled 1= Enabled	-
E8	Activation of the optional serial output	0= Disabled 1= Enabled	-
E9	Activation of jump output from charge alarm	0= Disabled 1= Enabled	Load control functioning
E10	Visualization of the analog output	0= Current 1= Voltage	-
E11	Menu display	0= Ecomatic-net 1= Ecomatic	-
E12	Configuration input n°1	From 0 to 8	Inputs functioning Note: E15 not used in ECOMATI-NET 4/6 models
E13	Configuration input n°2	From 0 to 8	
E14	Configuration input n°3	From 0 to 8	
E15	Configuration input n°4	From 0 to 8	

E0: configuration regarding pause values of the unit (P2, P3, P11 e P26).
The default value that comes out of the company if not specified is : **0**

E1+E2: configuration regarding working values of the unit (P4 e P12)

Working time chart:

E1	E2	Working time scale
0	0	scale 0.03 at 9.99 seconds
1	0	scale 0.3 at 99.9 seconds

0	1	scale 3 at 999 seconds
1	1	scale 3 at 999 dozen of seconds

The default value that comes out of the company if not specified is: **E1=0 e E2=0**.

E3: configuration of outputs load automatic recognition.

To optimize pause and working time in case of some outputs are not used, it is possible to activate the automatic load recognition.

The default value which come out of the factory, if not explicitly requested, is **1**.

E4: configuration of starting mode of the cleaning cycle.

When you start the cleaning cycle after the start up of the instrument, the cycle itself can start to work or counting first the pause time set, or starting immediately with the electrovalve activation.

The default value that comes out of the company if not specified is: **1**.

E5: configuration for the function of the load control.

Parameter used for particular applications with all the output connected.

This configuration is used to find out potential load faults not detected on the outputs. When the unit activates the output checks out the presence of the electrovalve and in the case it has been detected it arises a visual relay alarm (if enabled). Furthermore it is possible to decide if skipping the alarm outputs in the following cycles (look at **E9**).

The default value that comes out of the company if not specified is: **0**.

E6: configuration of the activation for cleaning cycle end type.

Parameter used for cells filters applications.

If the instrument is used to control the cells filters cleaning, it is necessary to choose the desired end cycle modality.

The default value which come out of the factory, if not explicitly requested, is **1**.

E7: configuration of the analogical output of the unit.

In the case the analogical output is installed in the unit on costumer's demand it is necessary to enable the function through this parameter.

The default value that comes out of the company if not specified is: **0**.

E8: configuration of the activation of the serial output of the unit.

In the case the serial output RS485 is installed in the unit on costumer's demand, it is necessary to enable the function through this parameter.

The default value that comes out of the company if not specified is: **0**.

E9: configuration of output skip with load alarm.

In the case you want to skip the outputs where it has been arisen a load alarm till a maximum of 10 outputs for all the models of ECOMATIC-NET series, it is necessary to set this parameter.

The default value that comes out of the company if not specified is: **0**.

E10: configuration of analogical output visualization.

According to the kind of analogical output you need to set the correspondent visualization mode for a proper values shown in the display.

The default value that comes out of the company if not specified is: **0**.

E11: visualization of programming menu.

In case you would like to use the connection of programming parameters in EOMATIC-NET version, it is enough to set this parameter to 0; otherwise, in case you want to keep the parameters connection similar to that of the precedent EOMATIC-NET models, you need to set this parameter to 1. The default value which come out of the factory, if not explicitly requested, is **0**.

E12 – E15: input configuration (look at the paragraph “**INPUT FUNCTION**”)

EOMATIC-NET FUNCTION

EOMATIC-NET instruments have different functioning possibility to clean the filters, to be set in parameter P1 and P38, which differ from the filter configuration (Standard, ON-Line Valv. Monostable, OFF-Line Valv. Monostable, ON-Line Valv. Bistable, OFF-Line Valv. Bistable), the filter cleaning mode (Manual, Automatic, Autopause, Remote and Synchronized) and the type of electrovalves control (Single, Multiple, Skip).

All these combinations offer you a big possibility to chose and to find and use the better way to clean your filter. With these functioning modalities you can have a real save in air consumption and on the life of bags and filters, because you operate only when necessary.

Let's see in details these single functioning modalities:

FILTER CONFIGURATION

Standard: all the outputs of the economiser are used for valves control of filter cleaning .

ON-Line/OFF-Line Monostables Valves: the first output of the economiser is used to control the valves for the single cell opening/closing, while the other are for the valves control of filter cleaning. With the activation of the first output,, the valve won't be closed, while with the output not activated, the valve remains open.

Example of connection for OFF-Line Filter with Monostable valve:

The last output of the instrument (drawing of an EOMATIC20-NET) is used to control the monostable valve.

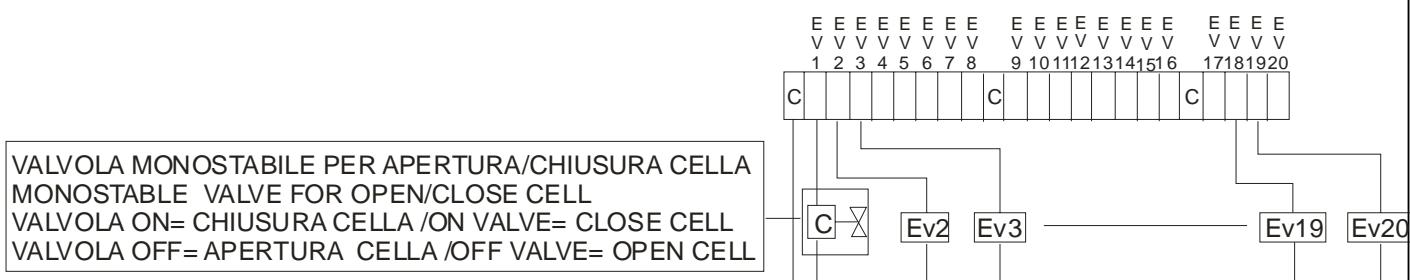
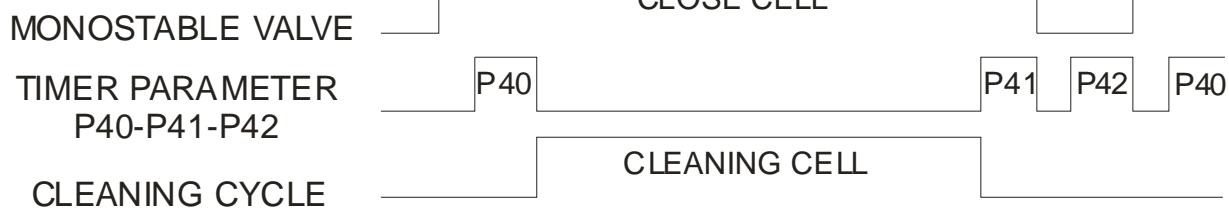


Chart which shows the control times for electrovalves of cell opening/closing.



As you can see from the chart, at each status change of the valve corresponds a little delay before the program timer starts to count. This is the excitement time of the valve (P39). This time is useful especially with bistable valves.

ON-Line/OFF-Line Bistable Valve: the first and the last output of Economiser are used to control the valves of cell opening/closing, while the other outputs are used for control of filter cleaning valves. The first output is used for cell closing; the last one for the cell opening.

Example of connection for OFF-Line Filter with Bistable valve:

The last two outputs of the instrument (drawing of an ECOMATIC20-NET) are used to control the bistable valve.

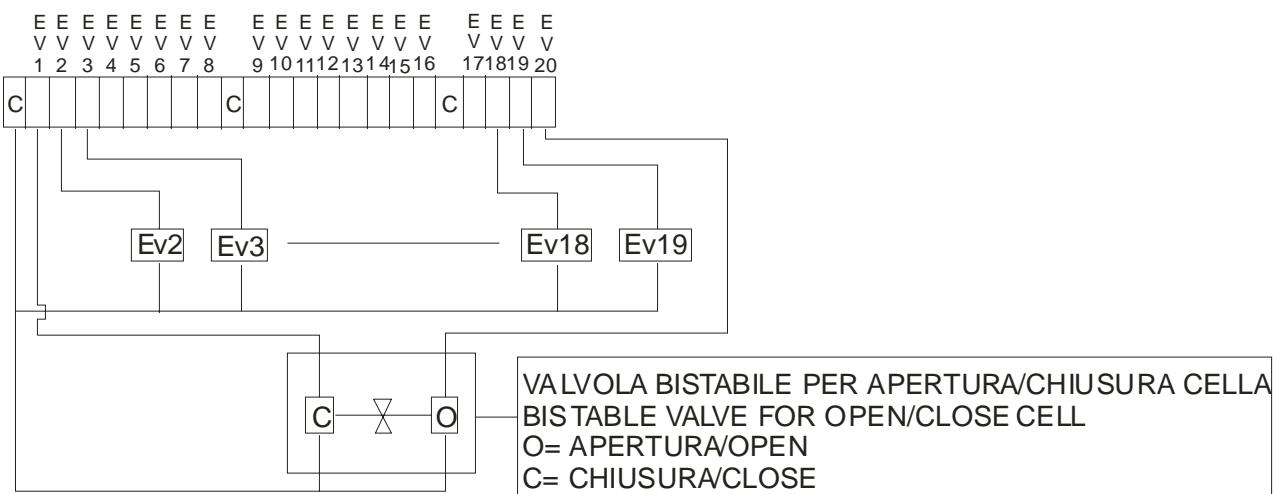
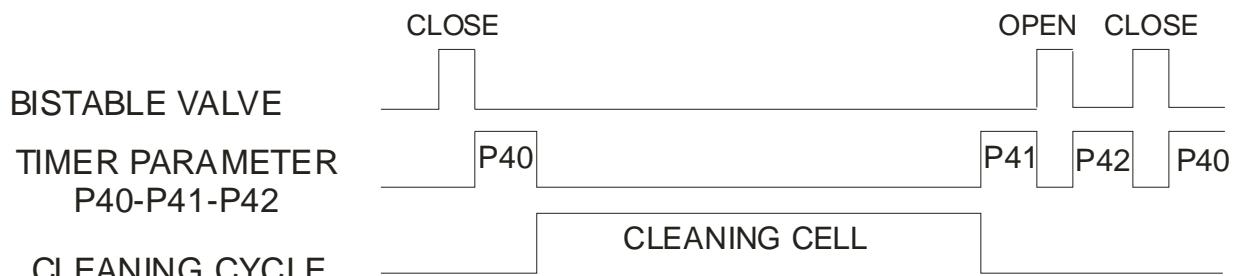


Chart which shows the control times for electrovalves of cell opening/closing.



CLEANING MODE

Manual: the ECOMATIC-NET drives one by one the output correspondent to the connected valves, regardless any kind of programming. The driving of the outputs starts from the first electrovalve, going ahead with the second, the third and so on and so on, after which starts again from the first. The working time and pause time will alternate each other between the activation of one output and the other.

Automatic: the electrovalves will be activated if the visualized pressure is higher to the one set in the parameter **P 5** (starting cleaning pressure); the activation itself will be interrupted as soon as the pressure will go down the value set in the parameter **P 6** (end cleaning pressure).

When the pressure goes down the end cleaning pressure, the normal cycle of function will be stopped just if the ECOMATIC-NET is on pause phase. On the other way round (if in working phase), it will be first ended the working phase running at that time.

When the pressure goes up the pressure of starting cleaning or a post-cleaning cycle starts, the ECOMATIC-NET does the job at the end of the pause, starting from the subsequent electrovalve of the last activated.

Autopause: the electrovalves will be activated if the pressure visualized is higher than the one set in the parameter **P 6** (minimum Auto pause pressure); the activation itself will be interrupted as soon as the pressure goes down this value.

The pause time between one shot and the other is changed automatically according to the pressure value measured. Higher the pressure is and lower the pause time between one shot and the other will be.

The pause time starts from the minimum value set in the parameter **P 3** (minimum Auto pause pause.) connected to the pressure value set in the parameter **P 5** (maximum Auto pause pressure), till getting the values set in the parameter **P 2** (maximum Auto pause pause) connected to the pressure values set in the parameter **P 6** (minimum Auto pause pressure).

N.B: pay attention please to the programming phase of these parameters, to avoid to change the values. This could lead to a faulty function of the unit with the cleaning performing times.

Let's now look at one example:

Programming of the function modality

Parameter	Programming
P 1	2 (Autopause)

Let's suppose we set these values

Parameters	Programming
P 2	40 seconds
P 3	10 seconds
P 5	100 mmH ₂ O
P 6	60 mmH ₂ O

The cleaning logic will be the following.

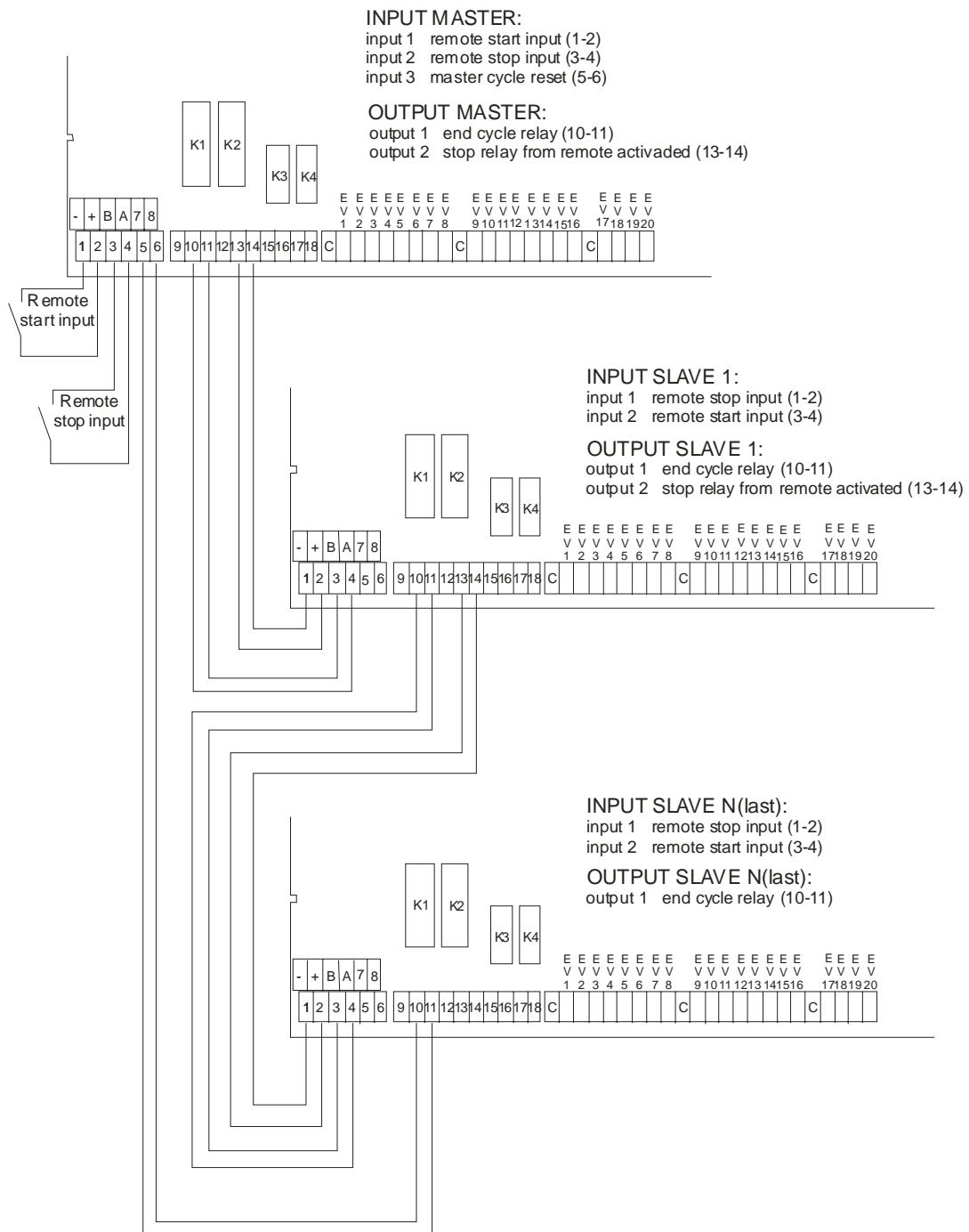
If the pressure is less than 60 mmH₂O the system is not making any washing, when the pressure is higher than 60 mmH₂O the system begins washing with a pause time of 40 seconds to decrease the pause time between one shot and the other a 10 seconds when the pressure reaches 100 mmH₂O. Pressure values in the intermediate pause time is automatically calculated in proportion.

Remote: the cleaning cycle is activated through the closing of the inlet start from remote, or through serial line with the remote start control. The cycle will remain activated up to the closing of the inlet stop from remote, or to the sending of the correspondent remote stop command.

Synchronized: this kind of cleaning is used when you need to control more than one device in series. The cleaning cycle is activated through the closing of the inlet start from remote, or through serial line with the remote start control on the MASTER card. It will be performed just a complete cycle of the device, then it will stop automatically. Once the cycle will stop, it will activate the following on through the relay, till the last SLAVE. When also the last SLAVE is over, it is possible to reset the line having a new cycle, through the inlet master cycle reset.

It is possible to stop the cycle in every moment, closing the inlet stop from remote. When you will open it again, it will be necessary to activate the start from remote to continue the cycle.

Example of connection to more devices in Synchronized modality:



In all these functioning modalities, in case the cleaning is interrupted and enabled again, the Economiser will start again from the point where it was interrupted.

In all these functioning modalities, every time you turn on the instrument, the cleaning cycle can start directly with the valve activation (working status) or wait a pause time (pause status), set in P42,

programming the configuration parameter E4. This choice has affects just on the first valve activated after each turning-on of the instrument. At the end of the first cleaning cycle and the start of the following one, the time set in P42 will be considered in the cleaning cycle as well.

The possible cleaning modalities are shown in the following pattern, and can be selected through P1 parameter.

	FILTER CONFIGURATION					FILTER CLEANING MODE				
	Stand	Onl-M	Onl-B	Ofl-M	Ofl-B	Man.	Aut.	Autp	Rem.	Syn.
P1=0	x					x				
P1=1	x						x			
P1=2	x							x		
P1=3	x								x	
P1=4	x									x
P1=5		x				x				
P1=6		x					x			
P1=7		x						x		
P1=8		x							x	
P1=9		x								x
P1=10			x			x				
P1=11			x				x			
P1=12			x					x		
P1=13			x						x	
P1=14			x							x
P1=15				x		x				
P1=16				x			x			
P1=17				x				x		
P1=18				x					x	
P1=19				x						x
P1=20					x	x				
P1=21					x		x			
P1=22					x			x		
P1=23					x				x	
P1=24					x					x

Key:

Stand.= Standard

Onl-M.= ON-Line Monostable Valve

Ofl-M.= OFF-Line Monostable Valve

Onl-B.= ON-Line Bistable Valve

Ofl-B.= OFF-Line Bistable Valve

Man.= Manual

Aut.= Automatic

AutP.= Autopause

Rem.= Remote

Syn. = Synchronized

EV COMMAND MODALITY

Single: the outputs for electrovalves command of filter cleaning are activated one after the other in consecutive way.

Multiple: more than one output for electrovalves command of filter cleaning are activated at the same time, up to 4 activated outputs.

Skip: for electrovalves command of filter cleaning are activated separately but far-between with skip settable from 2 to 4 outputs.

In the above schedule, you can find the values of P38 parameter which correspond to the various working combinations.

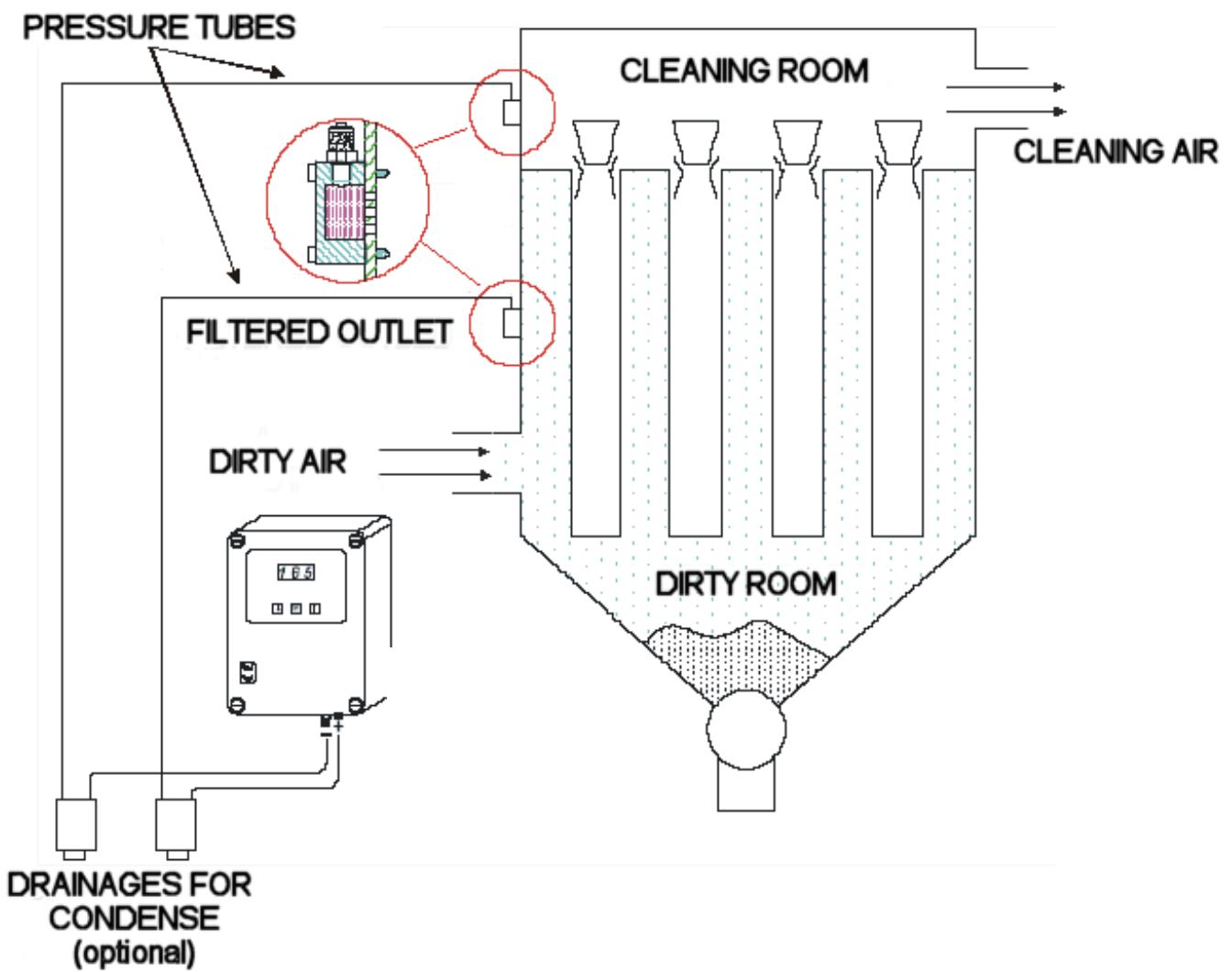
	EV COMMAND MODALITY					
	SINGLE	MULTIPLE	SKIP	2	3	4
P38=0	x			-	-	-
P38=1		x		x		
P38=2		x			x	
P38=3		x				x
P38=4			x	x		
P38=5			x		x	
P38=6			x			x

PRESSURE TUBES CONNECTION SCHEME

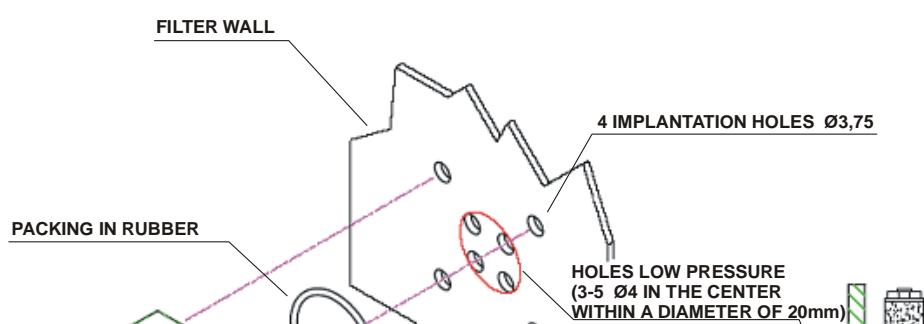
With the installation of pressure gauges is recommended the installation of filtered outlets to limit possible failure internal pressure sensor.

These filters prevent dust or other substances to be traced back to the pressure sensor and small bodies to obstruct the flow inside the tubes.

It can also be possible not to use these filters, but at the expense of the safety of the instrument. These filters are mounted directly on the filter where they are usually positioned in the outlet pipes. It is recommended to install a filtered outlets for each pressure tube applied, both with the extent of deltaP inside the filter:



Let's have a look now at the installation of these filters in details.



PRESSURE ZERO SETTING

During the operation it may happen that the pressure on the display slightly different for equal pressure applied to the sensor, due to the changing conditions of temperature, humidity, etc... . To restore the correct pressure, you must perform an operation to eliminate the pressure reading of the instrument.

Entering programming using the key **E** in the menu and make sure that the jets of grafting of the tubes are free, i.e. not connected to the pipes from the air filter.

Pressing **Inc** select the parameter **H 0** and follow the steps listed below:

- press **E** (flashes the message **0**);
- wait 4 or 5 sec.;
- confirm the reset by pressing the **E** key (the display will show once more the indication **H 0**)
- wait 5 seconds so that the display returns to the pressure value and verify that the reading is 0.

CAUTION

Pressure can be reset (parameter **H 0**) only if the pressure reading on display with outlets open is notably different from zero. This operation must be carried out exclusively by skilled personnel and only after the instrument has been switched on for at least 15 minutes.



OUTPUTS TEST ACTIVATION FUNCTION

It is possible to use a particular configuration of the card to prove each exit in case it becomes necessary during the testing, maintenance or any mal operations.

To join this setup go with the Key **Dec** (↓) on the number visualization of the active output.. In this condition simultaneously press the keys **Inc** (↑) e **Dec** (↓) and so it enters the menu of test outputs. Once you will enter you will see the number of outputs by activating flashing.

To activate the visualized output press the key **E**, while to change the number of output use the keys **Inc** (\uparrow) e **Dec** (\downarrow). The minimum time that must pass for a shot through the following key **E** is 1 second. To return to the normal cycle of operation simultaneously press all three keys.

If you have the serial RS485 output on the controller, you can perform this function testing with dedicated serial commands from PC.

Ev. Test Command: this function is able to perform the functioning test of the single outputs through the serial commands, as you can do directly on the device.

The command and its description is described here under:

Hexadecimal command (Data 16 bit hex) **A B C D** where:

A = activation of test modality (0= disabled; 1=enabled);

B = attivazione sparo uscita (0= disabled; 1=enabled);

C – D = number of the output to be activated (hex);

Inlet command in test with setting of valve n°2 : 1002 (hex).

Inlet command in test with setting and activation of valve n°4 : 1104 (hex).

Inlet command in test with setting and activation of valve n°20 : 1114 (hex).

Output command and test reset : 0000 (hex).

HOURS COUNTER FUNCTION

The value hours counter is possible to be visualized in the parameter L 1 from the programming menu.

Still in the programming menu it is possible to configurate the mode of counting of the hours counter.

This can be done through the parameter **P 23** in the following ways:

- 1) **P 23= 0** the hours counter starts to count from the initial of the instrument;

- 2) **P 23= 1** the hours counter starts to count when the pressure visualized on the display is higher or equal to the one set in the parameter **P 24**;
- 3) **P 23= 2** the hours counter counts just in the cleaning phase of the filter.

The maximum value that can be set for the number of hours is “**65534**”, after which the counter is reset automatically.

Although the instrument is fitted with a 3-digit display, numbers comprising up to 5 digits can be displayed: for values from **0** to **999**, the number of hours is displayed as normal; for values *greater* than **999**, the display cannot show the entire number but when one of the 2 outer numbers (left or right) flashes, this indicates that the number on display is not complete. If the left number flashes, the remaining numbers for display are to the left and vice versa. If both numbers flash this means that there is a number remaining both to the left and right.

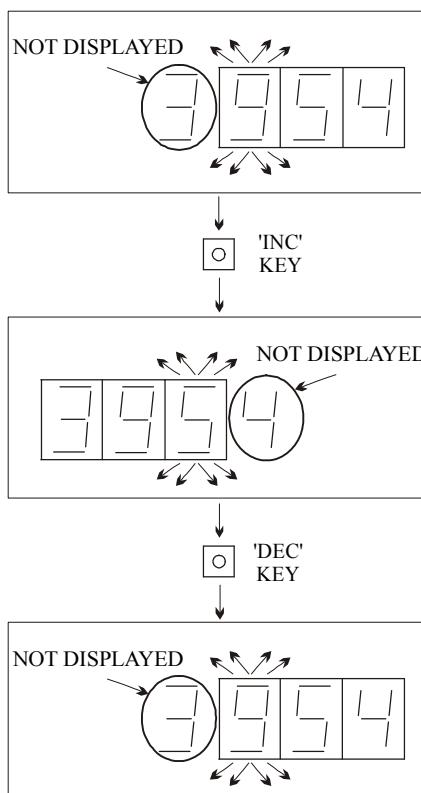
Example

If the number displayed is “**954**” and the number **9** is flashing, this means that there is a hidden number to the left of the number 9. Press “**inc**” to display the number to the left (the other numbers are shifted to the right). At this point, the number displayed is “**395**” but the whole number is “**3954**”; in this case the number **5** flashes to indicate a number remaining to the right. Press “**dec**” to display the number to the right (the other numbers are shifted to the left, concealing the first figure to the left); the figure “**954**” returns on display.

CYCLES COUNTER FUNCTION

Parameter **L2** enables access and display of the counter monitoring operation cycles performed during output scanning.

The counting is done every time one complete cycle of activation of outputs even if these are not connected.



The total number of possible cycles is “**65534**”, after which all stored values in the counter memory are reset.

The method to display the number of cycles is as described above for the hour counter.

INPUT FUNCTION

Inputs present in ECOMATIC-NET have different operation modes selectable in the setup menu in **E12, E13, E14 e E15** parameters. Each input is independent from the others, with its own configuration.

The modes of operation are:

- 1) **= 0 disabled input**
- 2) **= 1 external post- cleaning input:** when it is closed and enabled the external post cleaning function (P 7=2), it activates the post cleaning cycle.
- 3) **= 2 triboelectric input:** when it is enabled (P 27>0) and it keeps closed for the time set in the parameter (if P 27=3 that it is to say at least for 3 seconds), it activates the triboelectric alarm;
- 4) **= 3 remote start input:** when it is closed, it activates the cleaning cycle in all the functioning modalities, except the Manual.
- 5) **= 4 remote stop input:** when it is closed, it deactivates the cleaning cycle in all the functioning modalities. The cleaning cycle will be stopped immediately or at the end of the actual cycle, on the basis of the E6 configuration. This input is more important than the external start input;
- 6) **= 5 external pause enable input:** When it is closed it activates the external pause programmed in the parameter P 34, instead the one used by the normal programming (this input has an effect in the Manual, Automatic and Remote function modes, not in the Auto pause);
- 7) **= 6 header tanks gauge input:** when it is closed and enable (P 35>0), it activates the permission of cleaning from the gauge to indicate that internally the header tanks there is the right pressure to perform the cleaning.
- 8) **=7 remote enable input:** when it is closed it enables the normal function of the unit and it exits from the stand-by phase. This input has the priority rather than all the others.
- 9) **8=Inlet Master cycle reset:** when it is closed, it de resets the cleaning cycle of the instrument, and the relay of end cycle signal. This inlet is mainly used in case there are several devices connected in series, for its coordination. See description Synchronized functioning.

RELAY OUTPUTS FUNCTIONING

The relays present on the ECOMATIC-NET have different ways of functioning, selectable in the programmation menu. Each relay is independent from the others, with its own parameters and with the possibility to activate every relay in a different way.

The possible ways of functioning are:

- 1)**= 0 as minimum relay:**

- a) standard (see paragraph **STANDARD MINIMUM RELAY**);
- b) temporized relay (see paragraph **TEMPORIZER OUTPUT**);
- c) hysteresis (see paragraph **HYSTERESIS OUTPUT**);

2)= 1 as maximum relay:

- a) standard (see paragraph **STANDARD MAXIMUM RELAY**);
- b) temporized relay (see paragraph **TEMPORIZER OUTPUT**);
- c) hysteresis (see paragraph **HYSTERESIS OUTPUT**);

3)= 2 system-ok and system-on relay: the relay activates and remains active once you turn on the device and if you don't find anomalies in the micro-processor functionalities.

4)= 3 cycle-on relay: the relay activates and remain active during the whole cleaning of the filter

5)= 4 relay active in postcleaning phase: the relay activates and remains active during the whole postcleaning phase

6)= 5 relay active at the end of the postcleaning phase: the relay activates at the end of the postcleaning phase for a period of time selectable in the parameter "function value";

7)= 6 triboelectric alarm relay: the relay activates and remain active when there is a triboelectric alarm;

8)= 7 load alarm relay: the relay activates and remains active when no output valves are detected

9)= 8 relay active with active output: the relay activates when the working phase of a linked output is activated (the minimum working time for a correct activation of the output which activates the relays is 0.15s, for inferior times the start is not sure);

10) = 9 relay active in pause: the relay activates when the pause phase is activated;

11) = 10 start relay from remote activated: the relay is activated when the inlet start from remote is open, or when the serial start command from remote is sent.

12) = 11 start relay from remote deactivated: the relay is deactivated when the inlet start from remote is closed, or when the serial start command from remote is sent.

13) = 12 stop relay from remote activated: the relay is activated when the inlet stop from remote is closed, or when the serial stop command from remote is sent.

14) = 13 stop relay from remote deactivated: the relay is activated when the inlet stop from remote is closed, or when the serial start command from remote is sent.

15) = 14 end cycle relay: the relay is activated, in Synchronized modality, at the end of the cleaning cycle, and it remains activated till the opening of the inlet start from remote for Slave instruments, or of the inlet reset master Cycle for Master devices. For the other modalities, the relay will be activated at the end of the cleaning cycle, for a certain time settable by the parameter "value of relay n° ... function" of the associated relay.

16) = 15 external pressure switch alarm relay: the relay activates and remain active when the consent from the pressure switch doesn't arrive within the programmed time.;

The inlets that can influence the condition of the card cleaning, have a priority scale.

Here follows this scale (from the top):

- inlet enabling from remote;
- inlet stop from remote or serial stop command from remote;
- inlet start from remote or serial start command from remote;

RELAY OF STANDARD MINIMUM AND MAXIMUM

Let's suppose to work with relay 1 as **minimum standard relay**.

First of all we need to set the value 0 in parameter P 14 and P 15, in P 13 the pressure value of relay work. When the pressure is equal or less then pressure in P 13, our relay will be activated.

Let's suppose to work with relay 1 as **maximum standard relay**.

First of all we need to set the value 1 in parameter P 14 and P 15, in P 13 the pressure value of relay work. When the pressure is major then pressure in P 13, our relay will be activated.

TEMPORIZIZED OUTPUT

The temporized output allows us to activate the relay with a settable pressure gap.

1) E.i.: relay 1 as **minimum temporized relay**.

First of all, we need to set the value 0 in P 14 parameter, in P 13 parameter the pressure value for relay, in P 15 the value 2 and in P 16 our time value.

Let's suppose P 13 equal to 20mmH₂O and P 16 equal to 3 sec.

The functioning of our relay will be the following:

- the relay will be activated after 3 seconds when the pressure will be equal or less then 20mmH₂O;
- the relay will be deactivated when the pressure will be major then 20mmH₂O.

2) E.i.: relay 1 as **maximum temporized relay**.

First of all, we need to set the value 1 in P 14 parameter, in P 13 parameter the pressure value for relay, in P 15 the value 2 and in P 16 our time value.

Let's suppose P 13 equal to 20mmH₂O and P 16 equal to 5 sec.

The functioning of our relay will be the following:

- the relay will be activated after 5 seconds when the pressure will be major then 20mmH₂O;
- the relay will be deactivated when the pressure will be equal or less then 20mmH₂O.

OUTPUT WITH HYSTERESIS

Output with hysteresis allows us to activate and deactivate the relay with a settable pressure gap.

1) E.i.: relay 1 as **minimum relay and pressure hysteresis**

First of all we need to set the value 0 in parameter P 14, in P 13 parameter the pressure value for relay, in P 15 the value 1 and in P 16 our hysteresis pressure.

Let's set P 13 equal to 20mmH₂O and P 16 equal to 4 mmH₂O.

The functioning of our relay will be the following:

- the relay will be activated when the pressure will be equal or less then $20-4=16$ mmH₂O;
- the relay will be deactivated when the pressure will be major then $20+4=24$ mmH₂O.

2) E.i.: relay 1 as maximum relay and with pressure hysteresis

First of all, we need to set the value 1 in P 14 parameter, in P 13 parameter the pressure value for relay, in P 15 the value 1 and in P 16 our hysteresis pressure.

Let's set P 13 equal to 20mmH₂O and P 16 equal to 4 mmH₂O.

The functioning of our relay will be the same:

- the relay will be activated when the pressure will be major than $20+4=24\text{mmH}_2\text{O}$;
- the relay will be deactivated when the pressure will be equal or less than $20-4=16\text{mmH}_2\text{O}$.

SYSTEM-OK AND SYSTEM-ON RELAY

This configuration allows to check the correct functioning of the instrument (power supply check and microprocessor), closing the contact between terminals COM. and N.O. in case there is any kind of problems. The opening of the previous contact indicates that the device has some functioning problems, that are:

- no power supply to the instrument;
- the micro processor is broken;
- the software does not work correctly or it stop due to disturbances or supply falling;

CYCLE-ON RELAY

This configuration allows to know when the cycle is in cleaning status in all the settable modalities and it will remain on till its conclusion. This is possible through the closing of the COM. and N.O. contacts.

POSTCLEANING RELAY

This configuration allows to know when the cycle is in Postcleaning time. This is possible through the closing of the COM. and N.O. contacts.

RELAY OF POSTCLEANING END

This configuration allows to know when the Postcleaning is finished, and it remains activated for a time settable through **P 16** and **P 20** parameters. This is possible through the closing of the COM. and N.O. contacts.

RELAY OF TRIBOELECTRICAL ALARM

This configuration allows to know when you have a triboelectrical alarm. The relay will be activated till a complete reset of the device (ON-OFF) or through a general reset of the alarms. This is possible through the closing of the COM. and N.O. contacts.

RELAY OF ELECTROVALVES ALARM

This configuration (if activated) allows to know the presence of an alarms for electrovalves. This is possible through the closing of the contacts COM. and N.O. The possible anomalies could be the following:

- ~~the load is not connected to the output;~~
- the coil interrupted or its absorption is not enough for being detected;

The relay will be activated till a complete reset of the device (ON-OFF) or through a general reset of the alarms.

RELAY OF ACTIVATED OUTPUT

This configuration allows to know when it is activated a shot electrovalve output. The minimum time for relay activation is 0.1 second. This is possible through the closing of the COM. and N.O. contacts.

PAUSE RELAY

This configuration allows to know when the cycle is in pause time, and it remains activated till its conclusion. This is possible through the closing of the COM. and N.O. contacts.

RELAY START/STOP REMOTE

These configurations are used to supervise the commands (from inlet or serial command) of start and stop from remote, or to transfer a possible start or stop command to another device (Synchronized Modality).

END CYCLE RELAY

If the card is set to Synchronized Modality, configuration used when you need to control more than one device in series, the relay allows to know, through the closing of COM. and N.O. contacts, when the cycle of the instrument is over. In this way, it is possible to give the consent for the cleaning of next instrument. The relay remains activated till the opening of the inlet start from remote for Slave instruments, or till the opening of the inlet reset master cycle, for Master instruments. In the other functioning modalities, the relay allows to know, through the closing of COM. and N.O. contacts, when the cycle of the instrument is over. It will remain activated for a programmable time (value of the function of relay n°, e.i. P16)

RELAY OF EXTERNAL PRESSURE SWITCH

This configuration allows, through the closing of COM. and N.O. contacts, to know when you have an alarm of external pressure switch. The relay remains activated till a complete reset of the device (ON-OFF) or through the general reset of the alarms.

POST-CLEANING FUNCTIONING

Post-cleaning is activated through the closing of an external contact (if **P 7=2**), or when the pressure is *lower* than the value set in **P 10** parameter (se **P 7=1**); the economiser scans in sequence all the outputs, alternating work time (**P 12**) to pause time (**P 11**). The process ends after a *time* (if **P 8=0**) or the *number of cycle* (if **P 8=1**) set in **P 9** parameter.

The internal postcleaning (**P 7=1**) has effect in Automatic or Autopause modality, and not in the Manual functioning.

The external postcleaning (**P 7=2**) has effects in all the functioning modalities.

The postcleaning cycles begin to be counted starting from the first crossing of the electrovalve N°1 to consider complete scan cycles. If the post cleaning starts from valve N° 10 having 12 valves in total, the first cycle will be composed by 12 + 3 (10-11-12) valves.

Note: if **P 7 = 1**, the activation of the post-cleaning cycle can take place only if the device, after the ignition, has passed the threshold set in **P 10** at least one time.

EXTERNAL PAUSE FUNCTIONING

In the parameter **P 34** you can set a value of additional pause that can be used as an alternative to the pause values programmed in parameters **P 2** and **P 3**. The pause set in the parameter **P 34** is used when it is closed on entry "**EXTERNAL INPUT PAUSE**" if configured. Once the input is activated, the shot cycle will use as pause time, the **P 34** value.

PRECOATING FUNCTIONING

When the ECOMATIC-NET is set to Automatic or Autopause, the parameter **P 21 = 1** and the parameter **P 22** is set to a value higher than the start pressure cleaning or minimum pressure, the tool remains stationary (in stop) till the pressure on the display shall not exceed the pressure of precoating.

After passing this threshold, the cyclical starts and now it behaves normally, that is the function of precoating is automatically disabled permanently (even power cycle the instrument, the disabled remain stored).

NOTE: To re-enable the function of precoating is necessary again to force the parameter **P 21 = 1**.

RIPETITIVE SHOTS FUNCTIONING

This function allows you to perform more than one shot on the same electrovalve, during the cleaning cycle, setting the number of shot you need in parameter **P25**.

With the setting of a number of shots major then 1, it is necessary to set the pause time between the shots on the same electrovalve in parameter **P 26**.

The pause set between the shots on the same electrovalve is assigned from the **P 26** value, while when you go to the following valve, the used pause time is the basis pause time of the system (**P 2** if Automatic, **P 3** if Manual/Remote/Synchronized or the calculated pause time, if Autopause).

TRIBOELECTRICAL FUNCTIONING

If ECOMATIC-NET is connected to the dust meter GDM-1 or SDM-1 or RP02, if the tribo function is enabled through the parameter **P 27** (=0 disabled or >0 activated with activation alarm time), when it comes the triboelectrical alarm condition through the closing of its input, on the display of the device you will see a flashing message to signal this anomaly: "**E n**" (if P38=0), where "n" is the number of the output, and it will be activated the alarm relay, if programmed, or "**F n**" (if P38≠0), where "n" is the number of the command, and it will be activated the alarm relay, if programmed. If other electrovalves in alarm are detected, the number of outputs or commands will roll alternately to visual all the electrovalves with errors. If the dust value will come back to the following cycle for a certain electrovalve, the respective alarm will be reset.

Through the parameter **P 28** you can skip the output or command where you had a triboelectrical alarm. The number set in this parameter indicates the maximum number of outputs or commands

which can be excluded on the line (e.i. **P 28=3**, the first 3 outputs with triboelectrical alarm will be excluded from the cycle). Once excluded, these outputs won't be controlled anymore till the complete reset of the instrument (turn-off), or a complete reset of the alarms.

In this modality, you will see just the outputs in alarm, which will be skipped up to a maximum of 10, while if you want not to skip them, you need to set **P 28** parameter =0.

TRIBOELECTRICAL SIGNAL CONNECTION

The connections between dust meter GDM-1, SDM-1, RP02 and ECOMATIC-NET take place through the triboelectrical input configured on the device. If the ECOMATIC-NET has not been assigned by a configuration for triboelectrical input, this connection cannot be performed.

The contact is brought to the ECOMATIC-NET input, so that, when it gets closed, ECOMATIC-NET shows the dust alarm condition through the displaying of the number of valve with the high dust. If there are many electrovalves with the same problem, ECOMATIC-NET will show their numbers one after the other.

LOAD CONTROL FUNCTIONING

In the ECOMATIC-NET devices, it is possible to use a special function (activated through the configuration parameter **E5**) to check the presence and the correct functioning of output load. Through this function, we can know if the load will be connected in the right way or if in a second moment it will be interrupted due to a cabling or coil problem.

The alarm condition is indicated through the displaying of code "**H n**" (where "n" indicates the number of output in current) or "**L n**" (where "n" indicates the number of command in alarm status).

If programmed, also the relay for load alarm will be activated. The number of outputs or commands in alarm status will be displayed in series, in the same order of the alarm order on the outputs.

In this function it is necessary to use all the outputs of the device, to avoid continuous alarms to not used outputs. Furthermore, it is possible to choose if, when activated the alarm condition, the output you are interesting in has to be eliminated from the cycle (activated through the configuration parameter **E9**).

The number of outputs which can be excluded from the cycle are different according to the models:

- 2 outputs for ECOMATIC4-NET model;
- 4 outputs for ECOMATIC6-NET model;
- 10 outputs for all the other models;

TANK PRESSURE SWITCH FUNCTIONING

In all the modalities of instruments functioning, if the parameter **P 35>0**, the device will correct the pause between the shots on the basis of the programmed value and of the consent of tank pressure pressure switch, this last one through the pressure switch input and serial communication. In case of pressure switch consent is always verified, the device will perform the system pause time (**P 2** if Automatic, **P 3** if Manual/Remote/ Synchronized or the calculated pause time if Autopause). After the expiring of the basis pause time, if there is not the pressure switch consent yet, the device will wait another pause time, till receiving the consent, or till exceeding the latest time (value given by the basis pause time + the alarm time of **P 35** pressure switch). After exceeding the latest time, the device will go ahead following electrovalve control, the activation of alarm contact (if programmed) and the displaying of correspondent error code **A 1**.

EXAMPLE:

Programming of functioning mode:

Parameters	Programming
P 1	1 (Automatic)

Let's suppose to have the following parameters set:

Parameters	Programming
P 2	20 seconds
P 35	10 seconds
P 36	500 Kpa

If we use the tank pressure switch input as consent, **P 36** parameter won't be considered. On the other side, it will be necessary if we use the control through serial communication.

With pressure switch input from tank:

In input conditions always activated, the device will have a break of 20 seconds between a shot and the other one, while at the end of these 20 seconds the input is not activated, the pause will go on till the time will arrive to the latest time which come from the addition of basis pause time (20 seconds) and time of pressure switch alarm (10 seconds). If the time expected for input activation is higher then the addition of these two parameters (30 seconds), the device will perform the valve shot but it will activate the alarm relay if programmed and it will visualize the error code **A 1** on the display. If the input activation will come early then 30 seconds of latest time, the device won't signal any anomaly.

Con control through serial communication:

If you are using the control through the serial transmission, you need to set in **P 36** parameter the pressure value of reference. When the value read by the pressure switch on the tank and transmitted through serial line to the ECOMATIC-NET is equal or higher then the value set in **P 36**, the device will work in the same way of a simple input activation.

NOTE: you can give the consent also using both activation methods.

FUNCTIONING NUMBER OR ACTIVATED COMMANDS FOR CLEANING EV

In all the functioning modalities of the device, it is possible to chose in **P37** parameter, the number of activated outputs; in case of EV single Command Modality (P38=0), or the number of activated commands in cleaning cycle, or in the other cases of EV Command Modality.

In case of EV single Command Modality, the wording on the display (**U. 2** e.i. for valve n°2) will correspond to the number of activated valve; otherwise, on the display you will have the wording (**C. 2** e.i. for command EV n°2), which corresponds to the number of the activated command in the cycle. It is possible to associate two or more activated valves to the command number, or even activated valves not in series, on the basis of the EV Command Modality.

For cells filter with monostable valves, or simple filters, the maximum limit of outputs or activated commands will be the total number of outputs of the instrument (e.i. ECOMATIC12-NET max. limit =12). For cells filters with bistable valves, the maximum number of output or activated commands will be the total number of outputs of the instrument, except 1 (e.i. ECOMATIC12-NET max. limit

12-1=11). The reason for that is that in cells filters with bistable valves, the last valve is not an output used for the cleaning, but a valve for cell opening/closing. For this reason, it will always be activated. These maximum limits can be reduced according to the EV Command Modality (P38).

END CYCLE FUNCTIONING

In cells configuration, it is possible, through the configuration parameter **E6**, the end cycle modality which has to be used in case of cleaning cycle stop. The possible choices are to EV Current (E6=0) or to Cell End (E6=1). With the modality Cell End, the cycle does not stop when the cleaning stop command arrives, but it will work till the cell opening, to complete the cleaning cycle, then it will stop. With the modality EV Current, the cleaning cycle will stop immediately after the last working phase of the cleaning valve, keeping the conditions of cell opening or closing.

ANALOGICAL OUTPUT FUNCTIONING (optional)

ECOMATIC-NET can provide a current or tension output, which changes in a linear way. When you place the order, you need to indicate the solution you need. Current or Tension output must be specified in order phase , as standard this option will be supplied with current output.

CURRENT OUTPUT

It is possible to generate a current which changes in a linear way between 4-20mA or between 0-20mA in output, through the programming of **P 32 e P 33** parameters.

P 32 parameter corresponds to the pressure which has to be supplied to obtain a current output equal to 4mA or 0mA.

P 33 parameter corresponds to the pressure which has to be supplied to obtain a current output equal to 20mA.

According to the displayed pressure, it is possible to generate a current output linear function of the pressure.

N.B. : Max applicable load 500ohm.

TENSION OUTPUT

It is possible to generate a tension which change in a linear way between 0-10V or 0-5V in output, through the programming of **P 32** and **P 33** parameters.

P 32 parameter corresponds to the pressure which has to be supplied to obtain a current equal to 0V.
P 33 parameter corresponds to the pressure which has to be supplied to obtain a current equal to 5V or to 10V.

On the basis of the displayed pressure, you can generate current output linear function of pressure.

NOTE: Minimum load applicable 1Kohm.

ANALOGICAL OUTPUT CONNECTION

Connection between ECOMATIC-NET and expansion card 4-20 mA and a potential external has to be performed using the following terminals on the basis of the instrument model:

- for ECOMATIC-NET 4/6, terminals n°5 (+) , n°6 (-) and n°7 (earth) ;
- for ECOMATIC-NET 12/20/32/64/96, terminals +, – and earth as indicated in the printed;

NOTE : in minor versions (ECOMATIC-NET 4/6) it is possible to foresee only one between analogical and serial output, because they use the same outputs terminals.

PROTOCOL OF RS 485 SERIAL COMMUNICATION CARD “MODBUS” (optional)

Communication takes place on a serial card RS485 half-duplex.

In case of lack of connection with an external device, this will be the **Master** while the ECOMATIC-NET card will be the **Slave**.

The protocol used is MODBUS-RTU. This is a standard used by different manufacturers, easy and confident in detecting possible errors.

The device has a settable baud rate and the transmission byte is composed by 1 start bit, 8 data bits, parity bit and 1 or 2 stop bits. The available operations are reading (code 03) and writing (code 06) and, at the moment, multiple reading and writing are not available.

All the device on the same communication line might have different addresses, to avoid any kind of transmission conflict. In that case there will be different answers on the line, with interlock problems. The general format for transmission between master and slave is the following:

RANGE	BYTE
Slave address (ID)	1
Function code	1
Data	n
Error check (CRC-16)	2

In P 29 you find the instrument address (ID).

The answer times to the master requested operations are short: 15ms more or less.

Let's see in details the possible messages between master and slave, in particular, cases of reading and writing requested by the master.

Reading operation of a single word:

REQUEST FROM MASTER TO SLAVE	
RANGE	BYTE
Slave address (ID=1-254)	1
Function code (03)	1
Word address (high byte hex)	1
Word address (low byte hex)	1
Number of word (high byte hex)	1
Number of word (low byte hex)	1
Error check (CRC-16) (low byte hex)	1
Error check (CRC-16) (high byte hex)	1

ANSWER FROM SLAVE TO MASTER	
RANGE	BYTE
Slave address (ID=1-254)	1
Function code (03)	1
Byte count	1
Data (hex)	2
Error check (CRC-16) (low byte hex)	1
Error check (CRC-16) (high byte hex)	1

Example of reading between master and slave (hexadecimal values)

MASTER → 02-03-00-01-00-01-CRCl-CRCh

SLAVE → 02-03-02-00-01-CRCl-CRCh

where:

02= address of the slave to be interrogated;

03= code of the operation to be performed;

00 e 01=address to be read (see schedule of parameters addresses);

00 e 01=number of word to be read (word=16bit, that is 2 bytes, **fix value**);

CRCl and **CRCh**= low part and high part of test word for check of possible errors;

Writing operation of a single word:

REQUEST FROM MASTER TO SLAVE	
RANGE	BYTE
Slave address (ID=1-254)	1
Function code (06)	1
Word address (high byte hex)	1
Word address (low byte hex)	1
Data (hex)	2
Error check (CRC-16) (low byte hex)	1
Error check (CRC-16) (high byte hex)	1

ANSWER FROM SLAVE TO MASTER	
RANGE	BYTE
Slave address (ID=1-254)	1
Function code (06)	1
Word address (high byte hex)	1
Word address (low byte hex)	1
Data (hex)	2
Error check (CRC-16) (low byte hex)	1
Error check (CRC-16) (high byte hex)	1

Example of writing between master and slave of a data. (hexadecimal values)

MASTER → 02-06-00-01-00-C8-CRCl-CRCh

SLAVE → 02-06-00-01-00-C8-CRCl-CRCh

where:

02= slave address to be interrogated;

06= code of the operation to be performed;

00 e 01=address that you want to write (see schedule of parameters address);

00 e C8=numerical address that you want to write in the address (word=16bit, that is 2 bytes);

CRCl e CRCh= low part and high part of the test word for control of possible errors;

NOTE: Please remember that in ECOMATIC-NET it is possible to do only single reading and writing, that is of a single word.

Schedule of addresses used in communications, and parameters associated to them.

PROGRAMMING PARAMETERS					
Parameter Eco		Address(dec)	READ	WRITE	Admitted values in writing
E11=0	E11=1				
P 1	P7	02	yes	yes	From 0 to 24
P 2	P1	01	yes	yes	From 1 to 999
P 3	P16	04	yes	yes	From 1 to 999
P 4	P2	03	yes	yes	From 3 to 999
P 5	P8	14	yes	yes	From 0 to Full Scale
P 6	P9	15	yes	yes	From 0 to Full Scale
P 7	P4	06	yes	yes	0=Disabled 1=internal 2=external
P 8	P6	08	yes	yes	0=Time 1=Cycle
P 9	P3	09	yes	yes	From 1 to 999
P 10	P10	11	yes	yes	From 0 to Full Scale
P 11	P5	13	yes	yes	From 1 to 999
P 12	P17	12	yes	yes	From 3 to 999

PROGRAMMING PARAMETERS					
Parameter Eco		Address(dec)	READ	WRITE	Admitted values in writing
E11=0	E11=1				
P 13	P11	07	yes	yes	From 0 to Full Scale
P 14	P18	10	yes	yes	From 0 to 15
P 15	P19	16	yes	yes	0=Normal 1=Hysteresis 2=Temporized
P 16	P20	17	yes	yes	From 1 to Full Scale (Hysteresis) or From 1 to 999 (Temporized)
P 17	P21	22	yes	yes	From 0 to Full Scale
P 18	P22	23	yes	yes	From 0 to 15

P 19	P23	24	yes	yes	0=Normal 1=Hysteresis 2=Temporized
P 20	P24	25	yes	yes	From 1 to Full Scale (Hysteresis) or From 1 to 999 (Temporized)
P 21	P12	20	yes	yes	0=Disabled 1=Activated
P 22	P13	21	yes	yes	From 0 to Full Scale
P 23	P25	26	yes	yes	0=Ignition 1=Pressure Threshold 2=Cleaning Status
P 24	P26	27	yes	yes	From 0 to Full Scale
P 25	P27	28	yes	yes	From 1 to 10
P 26	P28	29	yes	yes	From 1 to 999
P 27	P29	30	yes	yes	0=Disabled From 1 to 999
P 28	P30	31	yes	yes	From 0 to 10
P 29	P31	35	yes	yes	From 1 to 254
P 30	P32	32	yes	yes	0=4800 1=9600 2=19200
P 31	P33	33	yes	yes	0=None 1=Even 2=Odd
P 32	P14	18	yes	yes	From 0 to Full Scale
P 33	P15	19	yes	yes	From 0 to Full Scale
P 34	P 34	05	yes	yes	From 1 to 999
P 35	P 35	34	yes	yes	0=Disabled From 1 to 999
P 36	P 36	36	yes	yes	From 1 to 999

PROGRAMMING PARAMETERS

Parameter Eco		Address(dec)	READ	WRITE	Admitted values in writing
E11=0	E11=1				
P 37	P37	37	yes	yes	1 – Eco n° Filter standard 1 – Eco n° Filter monost. cell 1 – Eco n°-1 Filter bistable cell
P 38	P 38	38	yes	yes	From 0 to 6
P 39	P 39	39	yes	yes	From 50 to 999
P 40	P 40	40	yes	yes	From 1 to 999
P 41	P 41	41	yes	yes	From 1 to 999
P 42	P 42	42	yes	yes	From 1 to 999
P 43	P 43	43	yes	yes	From 0 to Full Scale
P 44	P 44	44	yes	yes	From 0 to 15

P 45	P 45	45	yes	yes	0=Normal 1=Hysteresis 2=Temporized
P 46	P 46	46	yes	yes	From 1 to Full Scale (Hysteresis) or From 1 to 999 (Temporized)
P 47	P 47	47	yes	yes	From 0 to Full Scale
P 48	P 48	48	yes	yes	From 0 to 15
P 49	P 49	49	yes	yes	0=Normal 1=Hysteresis 2=Temporized
P 50	P 50	50	yes	yes	From 1 to Full Scale (Hysteresis) or From 1 to 999 (Temporized)

In the above schedule, you find the programming parameters and its addresses.

NOTE: Some parameters, when written (**P 29, P 30, P 31**), could:

- deactivate the serial communication (**P 29**) which could be activated again changing the address or by keyboard or changing the address of Master communication;
- be not effective, even if they are written (**P 30, P 31**).

To have them stored, you need to turn off and on again the device, to have the update configuration of the system with new data.

CONFIGURATION PARAMETERS

Address (dec)		READ	WRITE	Admitted values in writing
E 0	90	yes	yes	0=Seconds 1=Minuts
E 1 + E 2	91	yes	yes	0=(E 1=0 e E 2=0) from 3 to 999 1=(E 1=1 e E 2=0) from 3 to 999 2=(E 1=0 e E 2=1) from 3 to 999 3=(E 1=1 e E 2=1) from 3 to 999
E 3	92	yes	yes	0=Disabled 1=Activated
E 4	93	yes	yes	0=Pause 1=Work
E 5	94	yes	yes	0=Disabled 1=Activated
E 6	95	yes	yes	0=Disabled 1=Activated

E 7	96	yes	yes	0=Disabled 1=Activated
E 8	97	yes	yes	0=Disabled 1=Activated
E 9	98	yes	yes	0=Disabled 1=Activated
E 10	99	yes	yes	0=Current 1=Tension
E 11	100	yes	yes	0=Ecomatic-net 1=Ecomatic
E 12	101	yes	yes	From 0 to 8
E 13	102	yes	yes	From 0 to 8
E 14	103	yes	yes	From 0 to 8
E 15	104	yes	yes	From 0 to 8

In the above schedule, you find the configuration parameters and its addresses.

SPECIAL PARAMETERS FOR CONTROL AND MONITORING				
Address (dec)		READ	WRITE	Admitted values in writing
Analogical Output	60	yes	no	-
Pressure	61	yes	no	-
Relay Status	62	yes	no	-
External Pressure from Tank	63	yes	yes	From 1 to 999
Ev. Test Function	64	yes	yes	See "Test Function"
Hour-counter	65	yes	no	-
Number output or command active	66	yes	no	-
Cycle-counter	67	yes	no	-
Cycle Training	68	yes	yes	0=Normal 1=Stand-by
Alarm Status	69	yes	no	-

Number of Ev. in Test modality	70	yes	no	-
Cycle Status	71	yes	no	-
Unit of measurement	72	yes	no	-
Input Status	73	yes	no	-
Number of Ev. in load alarm	74	yes	no	-
Reset alarms	75	yes	yes	1=Reset alarms
Remote Command	76	yes	yes	0=Command disabled 1=Remote start command 2=Remote stop command
Number of Ev. in Triboelectrical Alarm	77	yes	no	-

Analogical Output: this function lets you know the value which has to be generated in output.

Pressure: this function allows to know the pressure value detected by the internal sensor.

Relay Status: this function allows to know the status of relays on the card.

The data (value to 8 bit) and its meaning is the following:

bit 0 = 0 Relay 1 Disabled;	bit 0 = 1 Relay 1 Activated;
bit 1 = 0 Relay 2 Disabled;	bit 1 = 1 Relay 2 Activated;
bit 2 = 0 Relay 3 Disabled;	bit 2 = 1 Relay 3 Activated;
bit 3 = 0 Relay 4 Disabled;	bit 3 = 1 Relay 4 Activated;

Bits used are on the basis of relays you have on the card.

External Pressure from Tank: in this address there will be the pressure value red by the external sensor on the tank, which has to be compared with threshold value in **P 36** programming parameter.

Command Test Ev: this function allows to perform the functioning test of the single outputs through serial operations, in the same way you operate directly on the device.

The order and its description is the following:

hexadecimal order (16 bit hex) A B C D where:

A = activation of test modality (0= disabled; 1=activated);

B = activation output shot (1=activated);

C – D = number of output to be activated;

Input control in test with setting of valve n° 2 : 1002 (hex).

Input control in test with setting and activation of valve n° 4 : 1104 (hex).

Command of test inlet with settings and activation of valve n° 20 : 1114 (hex).

Output control and reset from test : 0000 (hex).

Hours-counter: this function allows to know how many hours the instruments worked.

Number of output or activated command: this function allows to know the number of output or command which has been activated.

Cycle-counter: this function allows to know the total number of cleaning cycles performed by the instrument.

Cycle Training: with this function, you can put the instrument in stand-by if you need it.

Alarm Status: this function let you know the status of alarms activated on the card.

The data (value to 16 bit) and its interpretation is the following:

bit 0 = 0 No Alarm Load;	bit 0 = 1 Alarm Load;
bit 1 = 0 No Alarm System;	bit 1 = 1 Alarm System;
bit 2 = 0 No Tribo Alarm;	bit 2 = 1 Tribo Alarm;
bit 3 = 0 No Tank Pressure Switch Alarm;	bit 3 = 1 Tank Pressure Switch Alarm;

Number of Ev. in Test modality: this function allows to know the number of valve activated in Test modality.

Cycle status: this function allows to know the status of the device.

The values and their meaning are the following:

- 0= Cycle in **STOP** status;
- 1= Cycle in **CLEANING** status;
- 2= Cycle in **POSTCLEANING** status;

Unit of measurement: during calibration (except where clearly indicated the setting will be to 0), it is programmed the unit of measurement and the reading scale of pressure.

The values and theirs meanings are the following:

- | | |
|--|---|
| 0= mmH2O without codes after the comma; | 1= mbar without codes after the comma; |
| 2= Kpa without codes after the comma; | 3= pascal without codes after the comma; |
| 4= mmHg without codes after the comma; | 5= mmH2O with decimal values; |
| 6= mbar with decimal values; | 7= Kpa with decimal values; |
| 8= pascal with decimal values; | 9= mmHg with decimal values; |
| 10= mmH2O with cent values; | 11= mbar with cent values; |
| 12= Kpa with cent values; | 13= mmHg with cent values; |

Input Status: : this function allows to know the status of inputs on the card.

The data (value to 8 bit) and its meaning is the following:

bit 0 = 0 1 Disabled Input;	bit 0 = 1 1 Activated Input;
bit 1 = 0 2 Disabled Input;	bit 1 = 1 2 Activated Input;
bit 2 = 0 3 Disabled Input;	bit 2 = 1 3 Activated Input;
bit 3 = 0 4 Disabled Input;	bit 3 = 1 4 Activated Input;

Bits used are on the basis of the inputs you have on the card.

Number of EV in Load alarm: this function allows to know the outputs in load alarm.

Reset Alarms: this function allows to reset all the non-automatic alarms (triboelectrical alarms), the load alarms and the alarms of pressure switch on the tank.

Remote command: this function allows to activate or to stop the card cleaning cycle, through a serial command. This command has the same functioning of start inlet from remote and stop from remote. The commands are the following:

- 0= Disables command has no effect on the cycle;
- 1= Command start from remote activated;

2= Command stop from remote activated;

As for the inlet start and stop from remote, also this command follows the priorities of the cycle, as described in the section "Inlet Functioning".

Number of EV in Triboelectrical alarm: this function allows to know the outputs in Triboelectrical alarm, from dust emission probe.

ERROR MESSAGES

If during the communication you have an error in CRC, the ECOMATIC-NET cannot give any answer.

If there are errors in operation code or in parameter addresses, the instrument will reply with a message which identify the error received. The general format is the following:

RANGE	BYTE
Slave address (ID)	1
Function code (+80h)	1
Error code	1
Error check (CRC-16)	2

NOTE: In error message, the more relevant bit of Function code is brought to 1.

Schedule of errors and its parameters used in communications:

ERROR TYPE	IDENTIFICATION	ADMITTED VALUES
	VALUE IN MESSAGE	

	(HEX)	
Error of performed operation (only reading and single writing)	01	03h for reading 06h for writing
Error of data address	02	1 a 50 - 60 a 77 - 90 a 104 for reading 1 a 50 - 63 - 64 - 68 - 75 - 76 - 90 a 104 for writing
Error of data length (reading)	03	the data is to 16bit, corresponding to a word (value 1)
Error data range (writing)	03	See schedule

Example of reading message with data length error and answer of the corresponding slave:
MASTER → 02-03-00-02-00-02-CRC1-CRCh SLAVE → 02-83-03-CRC1-CRCh

Example of writing message with data address error and answer of the corresponding slave:
MASTER → 02-06-00-37-00-05-CRC1-CRCh SLAVE → 02-86-02-CRC1-CRC

Example of writing message with data range error and answer of the corresponding slave:
MASTER → 02-06-00-32-00-05-CRC1-CRCh SLAVE → 02-86-03-CRC1-CRC

FEATURES OF SERIAL RS485 CONNECTION (optional)

To perform the cabling of serial RS485 output, you need to put a connection cable to connect more than a device in series.

To connect the instruments each others, it is recommended to use a standard cable “EIA/TIA 568”, that is a cable normally used for cabling of Ethernet nets of category 5.

If the cable is put in very noisy places, due to electromagnetic sounds, it is recommended to use the following cable:

UTP cat. 5 in conditions of few electromagnetic noise (Unshielded Twisted Pair)
STP cat. 5 in conditions of a high electromagnetic noise (Shielded Twisted Pair)

SERIAL OUTPUT CONNECTIONS

ECOMATIC-NET can be equipped with a serial output RS485, which is used as data communication line (single reading and writing) with external units.

For exchange data it is necessary an interface schedule (converter) able to manage the conversion from Modbus protocol used by ECOMATIC-NET, to the desired protocol:

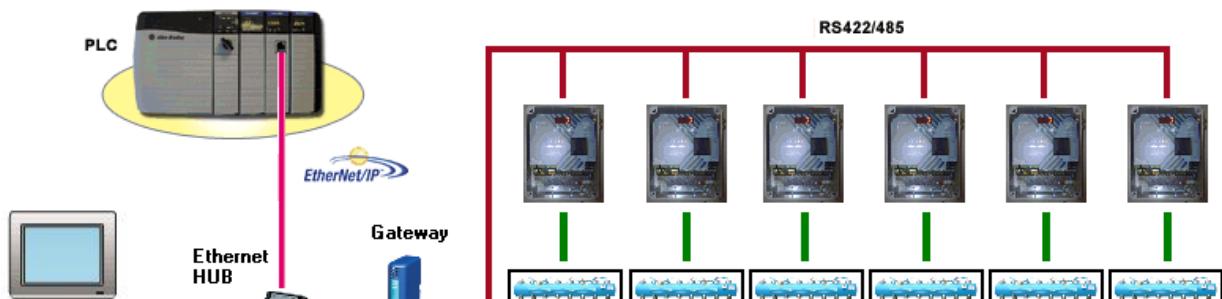
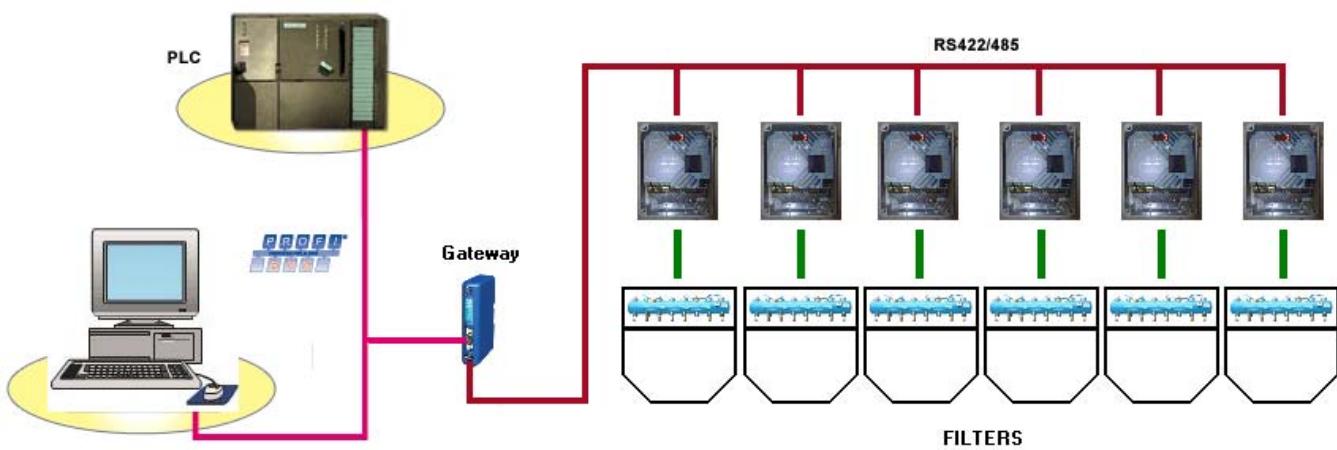
- converter RS 485 / RS 232; product code: 01000C01001 Model RSC301
- converter RS 485 / Ethernet; product code: PC9931SE5001 Model SE5001-S5
- converter RS 485 / Profibus; product code: PC9931GWY5000 Model GWY-500-B

The connection of signals has to be performed using the following terminals on the basis of the device model:

- for ECOMATIC-NET 4/6 terminals n°5 (A) , n°6 (B) e n°7 (connection frame) ;
- for ECOMATIC-NET 12/20/32/64/96 terminals A, B and connection frame as indicated on the print;

NOTE : in minor versions, (ECOMATIC-NET 4/6) it is possible to have only one output between the analog and the serial one because are used the same output terminals.

ECOMATIC-NET DESCRIPTION NET



ECOMATIC-NET devices can be equipped by an RS485 serial communication line with MODBUS RTU protocol.

You can connect groups of ECOMATIC-NET with appropriate communication forms Anybus, Profibus and ETHERNET, as shown in the figure.

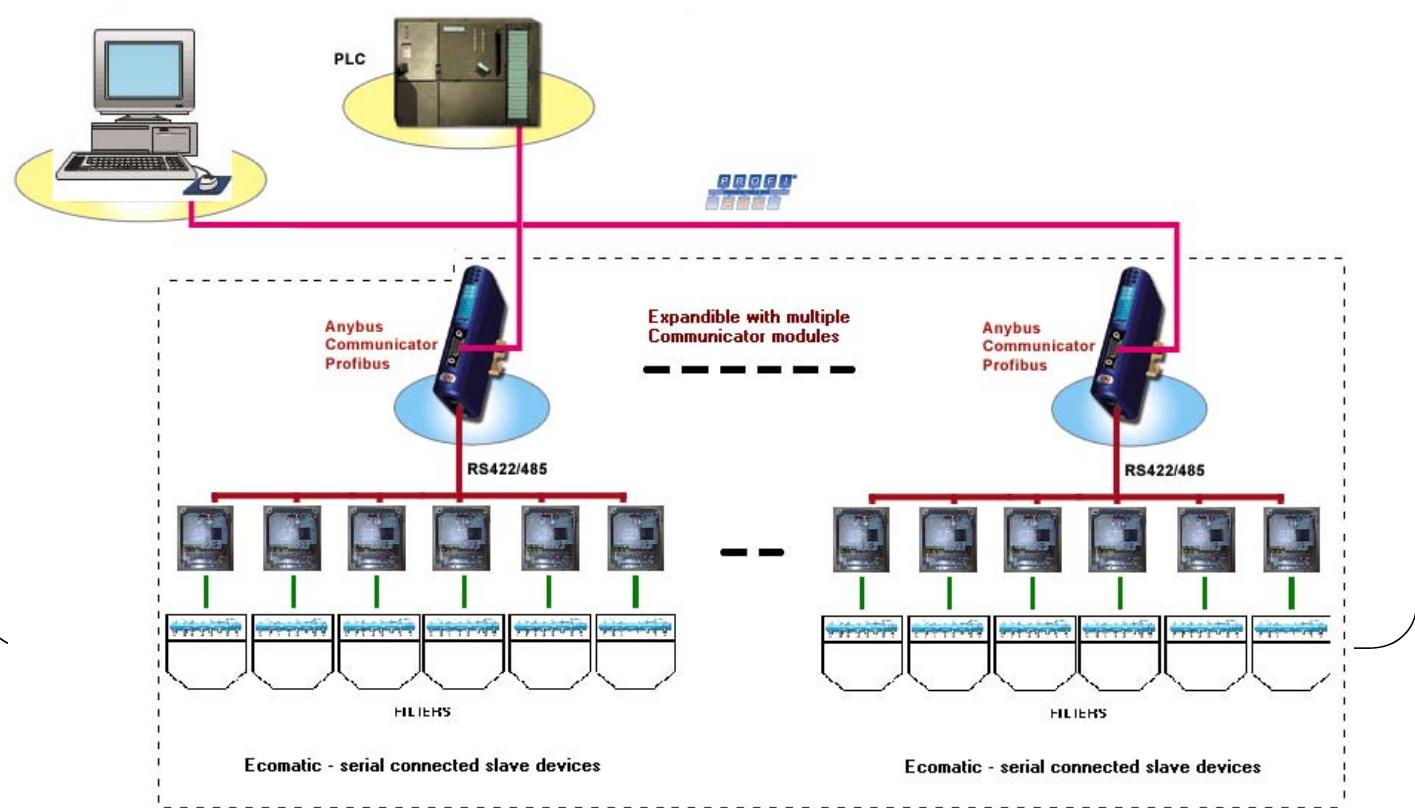
The ETHERNET line can support MODBUS TCP/IP, ETHERNET/IP e PROFINET protocols.

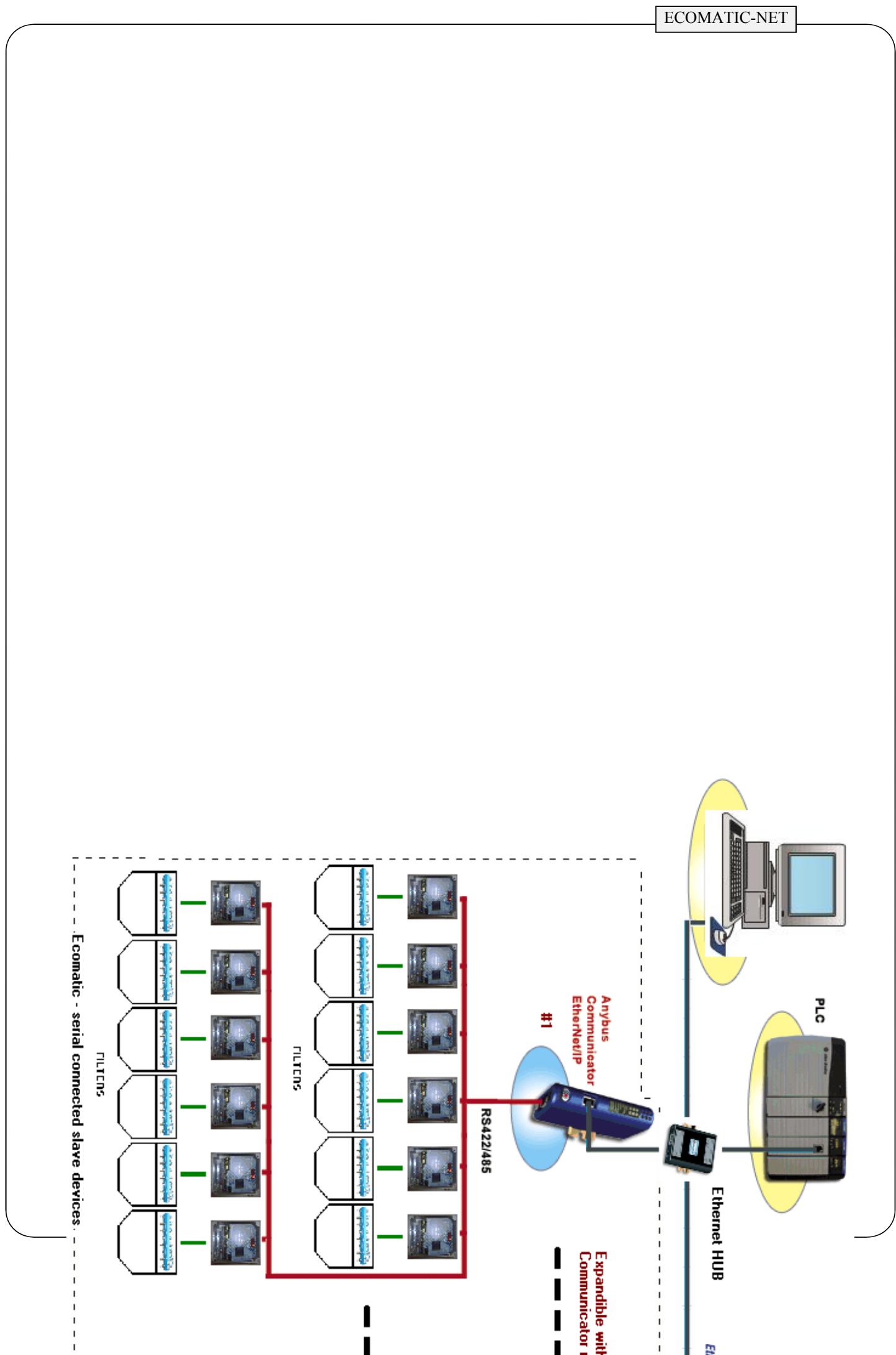
The PROFIBUS can support up to 6 ECOMATIC-NET.

The ETHERNET communication form can support up to 12 ECOMATIC-NET.

Each communication form has a certificated protocol, with the program to control it through user's PLC.

It is possible to connect more than one communication module, to have the possibility to control a bigger number of instruments, as shown in the following patterns:





LIST OF AVAILABLE PARAMETERS IN ECOMATIC-NET

<i>Net Address offset</i>	<i>Data name (16bit)</i>
0	Pause time Automatic or Pause max. Autopause (P2)
1	Working mode (P1)
2	Working time (P4)
3	Pause time Manual/Remote/ Synchronized or Pause min. Autopause (P3)
4	Cleaning start pressure or Pressure max. Autopause (P5)
5	Cleaning stop pressure or Pressure min. Autopause (P6)
6	Ev command modality (P38)
7	Number of activated valves or commands in cleaning mode (P37)
8	Time before cleaning cell (P40)
9	Time before opening cell (P41)
10	Time before cycle start (P42)
11	DP pressure
12	Outputs state
13	Test mode

14	Cycle enable
15	Alarms state
16	Cycle state
17	Inputs state
18	Reset Alarms
19	Remote command

NOTES:

NOTES:

CUSTOMER _____ **DATE** _____
ECOMATIC-NET model _____ **SERIAL NO.** _____
SOFTWARE version 1.1 **ORDER NO.** _____ **JOB ORDER NO.** _____

PARAMETERS PROGRAMMING FORM

Parameter Eco		Function	Possible values	Default value	Setting Value
E11=0	E11=1				
L1	L1	Hourcounter.	0 - 65534 hours	-	
L2	L2	Cyclecounter	0 - 65534 cycles	-	
P1	P7	Functioning modality	0 – 29	0	
P2	P1	Automatic pause time or maximum pause Autopause	1 – 999 seconds or minutes	5	
P3	P16	Manual pause time or minimum pause Autopause	1 – 999 seconds or minutes	5	
P4	P2	Working time.	0.03 – 9.99 seconds 0.3 – 99.9 seconds 3 – 999 seconds 30 – 9990 seconds	0.25	
P5	P8	Start cleaning pressure or maximum pressure Autopause	From 0 to F.S. positive	80	
P6	P9	End cleaning pressure or minimum pressure Autopause.	From 0 to F.S. positive	40	
P7	P4	Postcleaning function.	0=Disabled 1=Internal 2=External	2	
P8	P6	Postcleaning time or cycles selection.	0= Time 1= Cycles	1	
P9	P3	Value of time or cycles.	1 – 999 seconds 1 – 999 cycles	2	
P10	P10	Internal postcleaning pressure threshold	Da 0 al F.S. positivo	15	
P11	P5	Postcleaning pause time	1 – 999 secondi o minuti	3	
P12	P17	Postcleaning working time	0.03 – 9.99 secondi 0.3 – 99.9 secondi 3 – 999 secondi 30 – 9990 secondi	0.25	
P13	P11	Relay 1 pressure threshold	From 0 to F.S. positive	120	

Parameter Eco		Function	Possible values	Default value	Setting Value
E11=0	E11=1				
P14	P18	Relay 1 functioning selection.	0 – 15	1	
P15	P19	Function of relay 1.	0=Normal 1=Hysteresis pressure 2=Temporized	0	
P16	P20	Value of relay 1 function.	From 1 to F.S. positive or from 1 – 999 seconds	1	
P17	P21	Relay 2 pressure threshold	From 0 to F.S. positive	200	
P18	P22	Relay 2 functioning selection.	0 – 15	1	
P19	P23	Function of relay 2.	0=Normal 1=Hysteresis pressure 2=Temporized	0	
P20	P24	Value of relay 2 function.	From 1 to F.S. positive or from 1 – 999 seconds	1	
P21	P12	Enable precoating.	0=Disabled 1=Enabled	0	
P22	P13	Precoating threshold	From 0 to F.S. positive	100	
P23	P25	Hourcounter functionality	0=always enabled 1=pressure threshold 2=cleaning phase	0	
P24	P26	Hourcounter pressure threshold	From 0 to F.S. positive	10	
P25	P27	Number of repetitive shots for each output.	1 – 10 shot	1	
P26	P28	Pause time among consecutive shots	1 – 999 seconds or minutes	1	
P27	P29	Time of tribo alarm detection	0= Disabled 1 – 999 seconds	0	
P28	P30	Max number of valve to jump with tribo alarm	0=No jump 1 – 10 jumps	0	
P29	P31	ID device for RS485	1 – 254	1	
P30	P32	RS485 baud rate setting	0 = 4200 1 = 9600 2 = 19200	1	
P31	P33	Parity bit setting	0 = None 1 = Even 2 = Odd	0	
P32	P14	Value of pressure responding to the minimum value of the analog output	From 0 to F.S. positive	0	

Parameter Eco		Function	Possible values	Default value	Setting Value
E11=0	E11=1				
P33	P15	Value of pressure responding to the maximum value of the analog output	From 0 to F.S. positive	800	
P34	P34	Pause time from external contact	1 – 999 seconds	20	
P35	P35	Alarm time of tank's manostat	0= Disabled 1 – 999 seconds	0	
P36	P36	Tank's manostat threshold with serial	1 – 999 Kpa	100	
P37	P37	Number of valves or command in cleaning mode	1 – Command °n or 1 – Command °n-1	See Model	
P38	P38	Ev command modality	0 – 6	0	
P39	P39	Excitation valve time for cell opening/closing	0.50 – 9.99 seconds	1	
P40	P40	Time before cleaning cell	1 – 999 seconds	1	
P41	P41	Time before opening cell	1 – 999 seconds	1	
P42	P42	Time before start cycle	1 – 999 seconds	1	
P43	P43	Relay 3 pressure threshold	From 0 to F.S. positive	250	
P44	P44	Relay 3 functioning selection.	0 – 15	1	
P45	P45	Function of relay 3.	0=Normal 1=Hysteresis pressure 2=Temporized	0	
P46	P46	Value of relay 3 function.	From 1 to F.S. positive or from 1 – 999 seconds	1	
P47	P47	Relay 4 pressure threshold	From 0 to F.S. positive	300	
P48	P48	Relay 4 functioning selection.	0 – 15	1	
P49	P49	Function of relay 4.	0=Normal 1=Hysteresis pressure 2=Temporized	1	
P50	P50	Value of relay 4 function.	From 1 to F.S. positive or from 1 – 999 seconds	1	

CUSTOMER	DATE
ECOMATIC-NET model	SERIAL NO.
SOFTWARE version <u>1.1</u>	ORDER NO.
	JOB ORDER NO.

PARAMETERS CONFIGURATION FORM

Parameter	Function	Possible values	Default value	Setting Value
E0	Pause time unit	0= Seconds 1= Minutes	0	
E1+E2	Working time scale	See table	0 - 0	
E3	Activation of automatic load recognition	0= Disabled 1= Enabled	1	
E4	Start of the cleaning cycle modality	0= Pause Phase 1= Working Phase	0	
E5	Activation of load control functioning	0= Disabled 1= Enabled	0	
E6	Activation of cleaning cycle end type	0= EV Current 1= Fine Cell	1	
E7	Activation of the optional analog output	0= Disabled 1= Enabled	0	
E8	Activation of the optional serial output	0= Disabled 1= Enabled	0	
E9	Activation of jump output from charge alarm	0= Disabled 1= Enabled	0	
E10	Visualization of the analog output	0= Current 1= Voltage	0	
E11	Menu display	0= Ecomatic-net 1= Ecomatic	0	
E12	Configuration input n°1	From 0 to 8	1	
E13	Configuration input n°2	From 0 to 8	3	
E14	Configuration input n°3	From 0 to 8	5	
E15	Configuration input n°4	From 0 to 8	0	

Working time chart:

E1	E2	Working time scale
0	0	scale 0.03 at 9.99 seconds
1	0	scale 0.3 at 99.9 seconds
0	1	scale 3 at 999 seconds
1	1	scale 3 at 999 dozen of seconds

Project: Q.E. GESTIONE ECO64-NET E 60 ELETTROVALVOLE
E.B. MANAGEMENT ECO64-NET AND 60 ELECTROVALVES

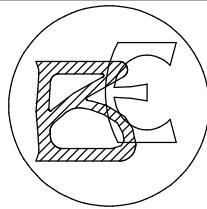
Customer: BALLESTRA

Job order: 994/35

Reference: Fq81032 - Job 1E35Z

Note:

Power Supply:	110Vac
Power Anticondensation Resistance:	
Power Solenoid Valve:	24Vac
Drw n°:	
	ITEM 64F1



BOLDROCCHI
ECOLOGIA

BOLDROCCHI s.r.l.
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Tel. 0039-(0)39 22021 Fax 0039-(0)39 2753498
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Rev.	Modifications	Date	Prepared	Verified	Approved of

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A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		T	TRASFORMATORE TRANSFORMER		RT	TERMICA THERMAL		HL	LED LED	B
C		QF	INTERRUTTORE AUTOMATICO MAGNETOTERMICO DIFFERENZIALE DIFFERENTIAL MAGNETO-THERMAL AUTOMATIC SWITCH		RT	CONTATTI TERMICA THERMAL CONTACTS		HL	SEGNALAZIONE QUADRO IN TENSIONE ELECTRIC PANEL VOLTAGE SIGNALING	C
D		QF	INTERRUTTORE AUTOMATICO DIFFERENZIALE DIFFERENTIAL AUTOMATIC SWITCH		KM	CONTATTORE CONTACTOR		SBE	PULSANTE DI EMERGENZA NORMALMENTE CHIUSO EMERGENCY PUSH BUTTON NORMALLY CLOSED	D
E		QS	SEZIONATORE SECTIONALISING SWITCH		KM	CONTATTI DI POTENZA CONTATTORE CONTACTOR POWER CONTACTS		SB	PULSANTE STABILE NORMALMENTE CHIUSO STABLE PUSH BUTTON NORMALLY CLOSED	E
F		QS	SEZIONATORE CON FUSIBILI SECTIONALISING SWITCH WITH FUSES		KM	CONTATTI AUSILIARI CONTATTORE CONTACTOR AUXILIARIES CONTACTS		SB	PULSANTE STABILE NORMALMENTE APERTO STABLE PUSH BUTTON NORMALLY OPENED	F
G		QS	INTERRUTTORE-SEZIONATORE AUTOMATICO AUTOMATIC SECTIONALISING SWITCH		KA	RELÉ RELAY		SA	SELETTORE DUE POSIZIONI (0-1) TWO POSITION SELECTOR (0-1)	G
H		F	PORAFUSIBILE NON SEZIONABILE NOT SECTIONABLE FUSE-CARRIER		KA	CONTATTI RELÉ RELAY CONTACTS		SA	SELETTORE A CHIAVE DUE POSIZIONI (0-1) TWO POSITION SELECTOR KEY (0-1)	H
I		F	PORAFUSIBILE SEZIONABILE SECTIONABLE FUSE-CARRIER		KT	TEMPORIZZATORE TIMER		SA	SELETTORE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR (1-0-2)	I
J		F	PORAFUSIBILE SEZIONABILE + NEUTRO SECTIONABLE FUSE-CARRIER + NEUTRAL		KT	CONTATTI TEMPORIZZATORE TIMER CONTACTS		SA	SELETTORE A CHIAVE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR KEY (1-0-2)	J
		Q	MAGNETOTERMICO MAGNETO-THERMAL		HL	LAMPADA LAMPEGGIANTE FLASHING LAMP		HA	SIRENA SIRENE	
		Q	CONTATTI MAGNETOTERMICO MAGNETO-THERMAL CONTACTS		HL	LAMPADA LAMP		HA	SUONERIA BUZZER	



V.LE TRENTO E TRIESTE N°93
20046 BIASONO (MI) ITALY
Tel. 039-22021 Fax 039-2753498
e-mail: boldrrochi@boldrrochi.eu

CUSTOMER:
BALLESTRA

DWG No:
ITEM 64F1

PROJECT: 994-35-R10

JOB ORDER: 994/35

SUBJECT: Q.E. GESTIONE ECO64-NET E 60 ELETROVALVOLE
E.B. MANAGEMENT ECO64-NET AND 60 ELECTROVALVES

TITLE: AIR INTAKE ELECTRIC BOARDS WIRING DIAGRAM & LAYOUT

DATE: 06/09/2010 DES.: G.Z.

REF: Fq81032 - Job 1E35Z

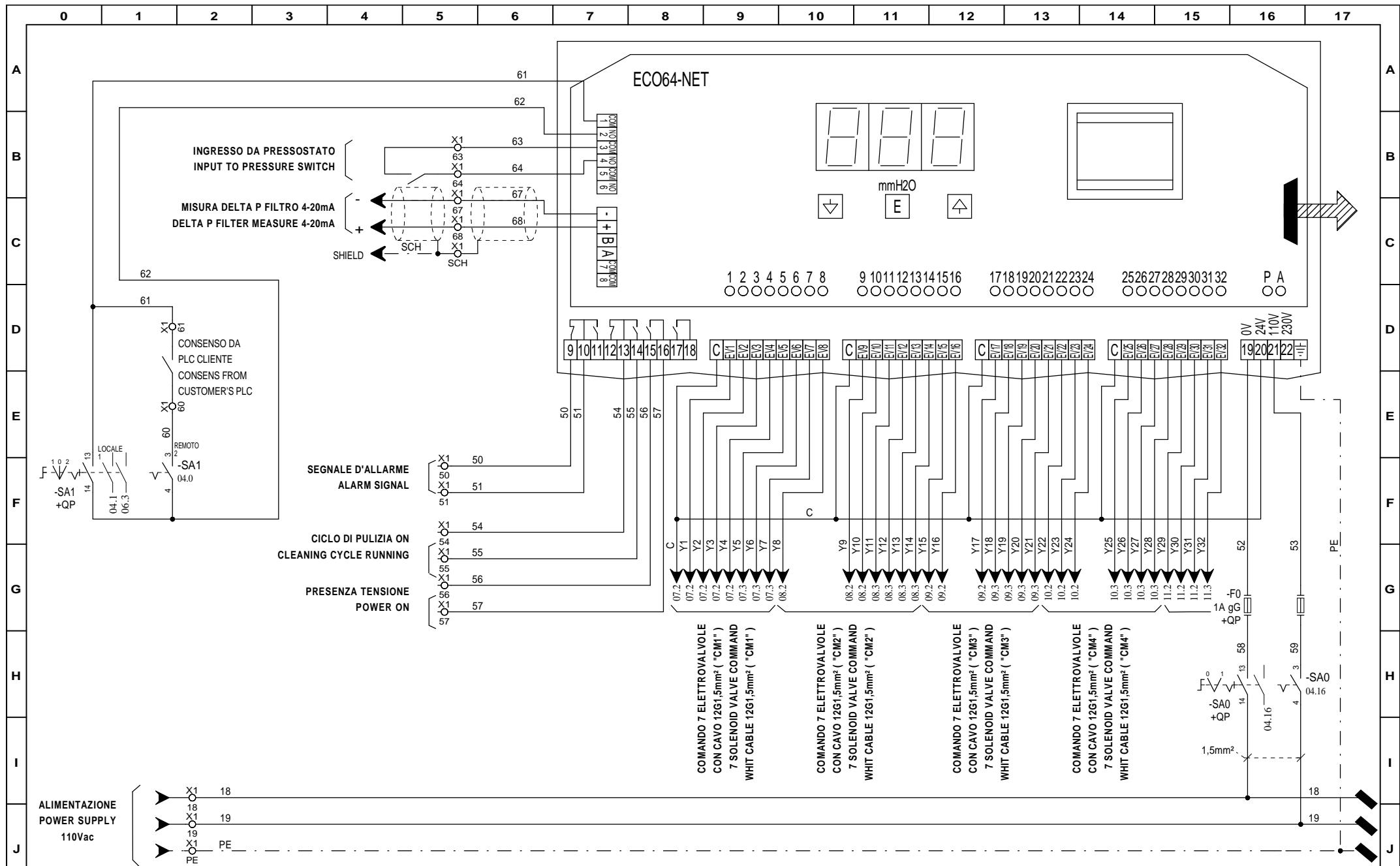
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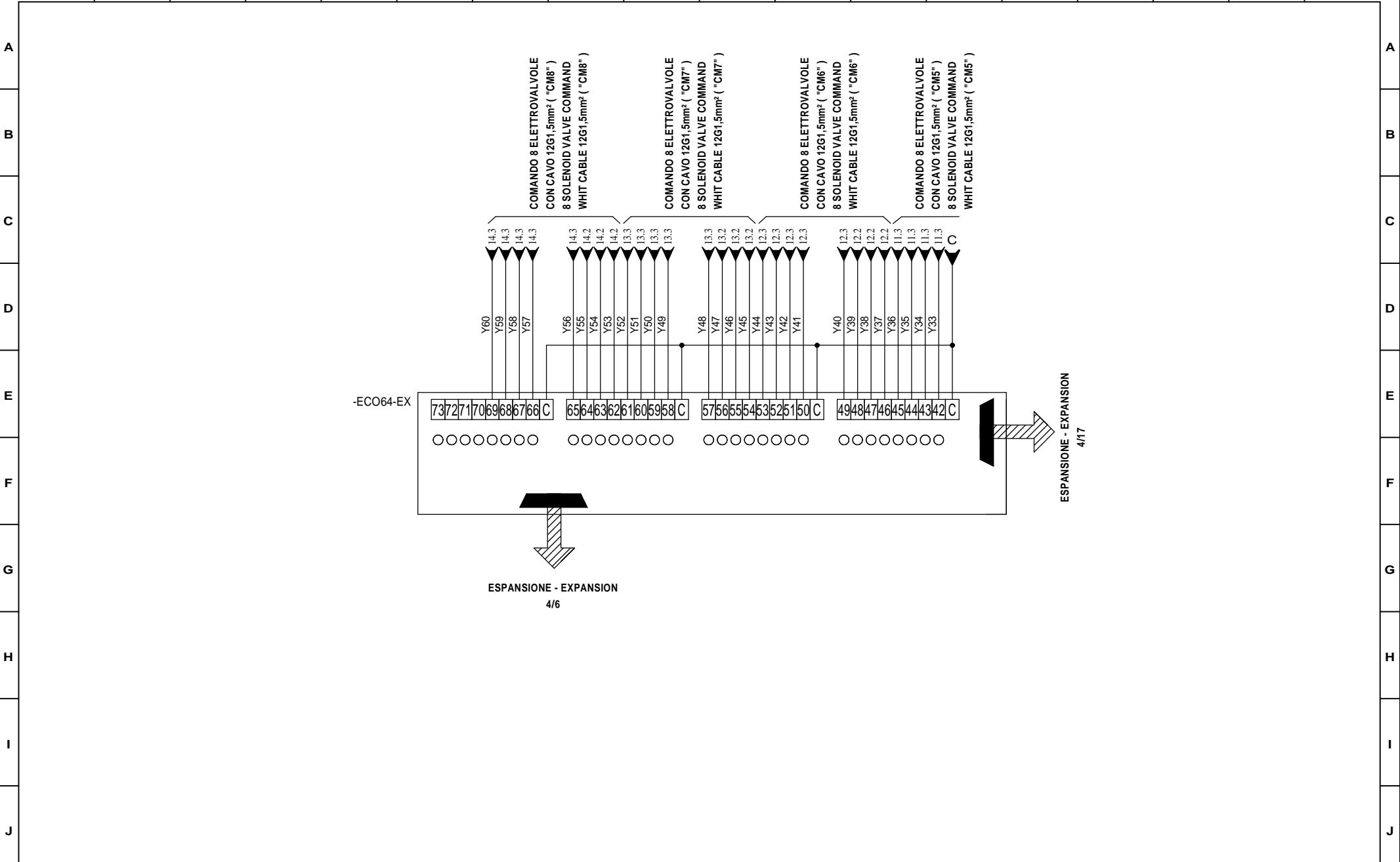
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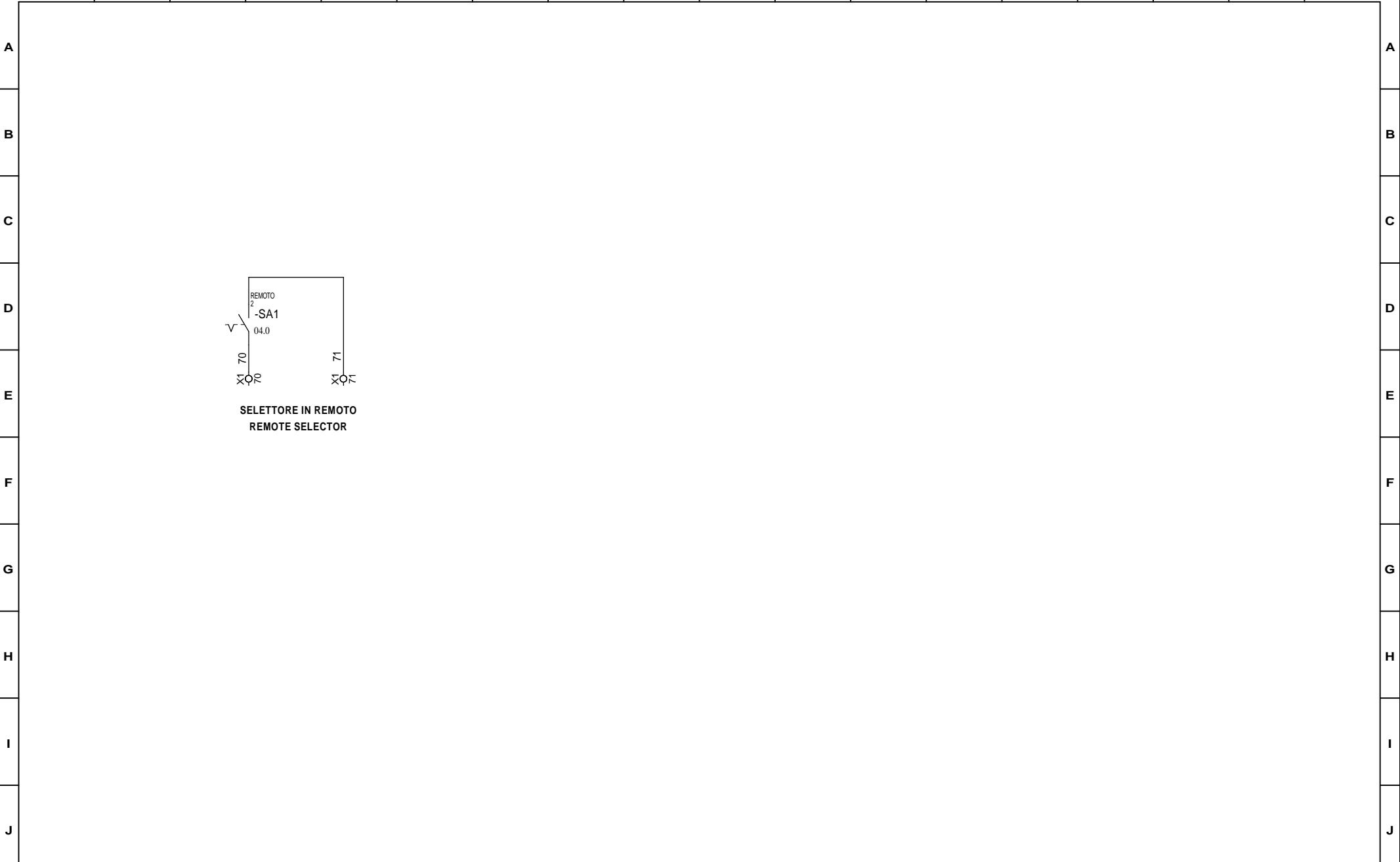
A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		SQ	FINECORSO LIMIT SWITCH		P	AMPEROMETRO AMMETER		G	ALIMENTATORE FEEDER	B
C		BF	FOTOCELLULA A RIFLESSIONE PHOTOCELL TO REFLECTION		P	VOLTMETRO VOLTMETER		YV	ELETTROVALVOLA MONOSTABILE MONOSTABLE SOLENOID VALVE	C
D		SQ	SENSORE MAGNETICO MAGNETIC SENSOR		R	RESISTENZA RESISTANCE		YV	ELETTROVALVOLA BISTABILE BISTABLE SOLENOID VALVE	D
E		SQ	SENSORE DI PROSSIMITA' PROXIMITY SENSOR		R	POTENZIOMETRO POTENTIOMETER		V	VENTOLA PER RAFFREDDAMENTO Q.E. E.B. COOLING FAN	E
F		SP	PRESSOSTATO PRESSURE SWITCH		R	GRUPPO RC RC GROUP		M	MOTORE MONOFASE MONO-PHASE MOTOR	F
G		ST	TERMOSTATO THERMOSTAT		R	VARISTORE VARISTOR		M	MOTORE TRIFASE THREE-PHASE MOTOR	G
H		S	GALLEGGIANTE FLOATING		L	INDUTTANZA INDUCTANCE		M	MOTORE STELLA/TRIANGolo S/T MOTOR	H
I		P	OROLOGIO CLOCK		XS	PRESA INTAKE		U	FRENO BRAKE	I
J		P	CONTATTI OROLOGIO CLOCK CONTACTS		XS	PRESA INDUSTRIALE 1P+N+T INDUSTRIAL INTAKE 1P+N+T		X	MORSETTO TERMINAL	J
		C	CONTATORE DI IMPULSI IMPULSES COUNT		XS	PRESA INDUSTRIALE 2P+N+T INDUSTRIAL INTAKE 2P+N+T		PE	BARRA DI TERRA EARTH BAR	
		TA	TRASFORMATORE AMPEROMETRICO AMMETER TRANSFORMER		E	NEON NEON		PE	TERRA EARTH	



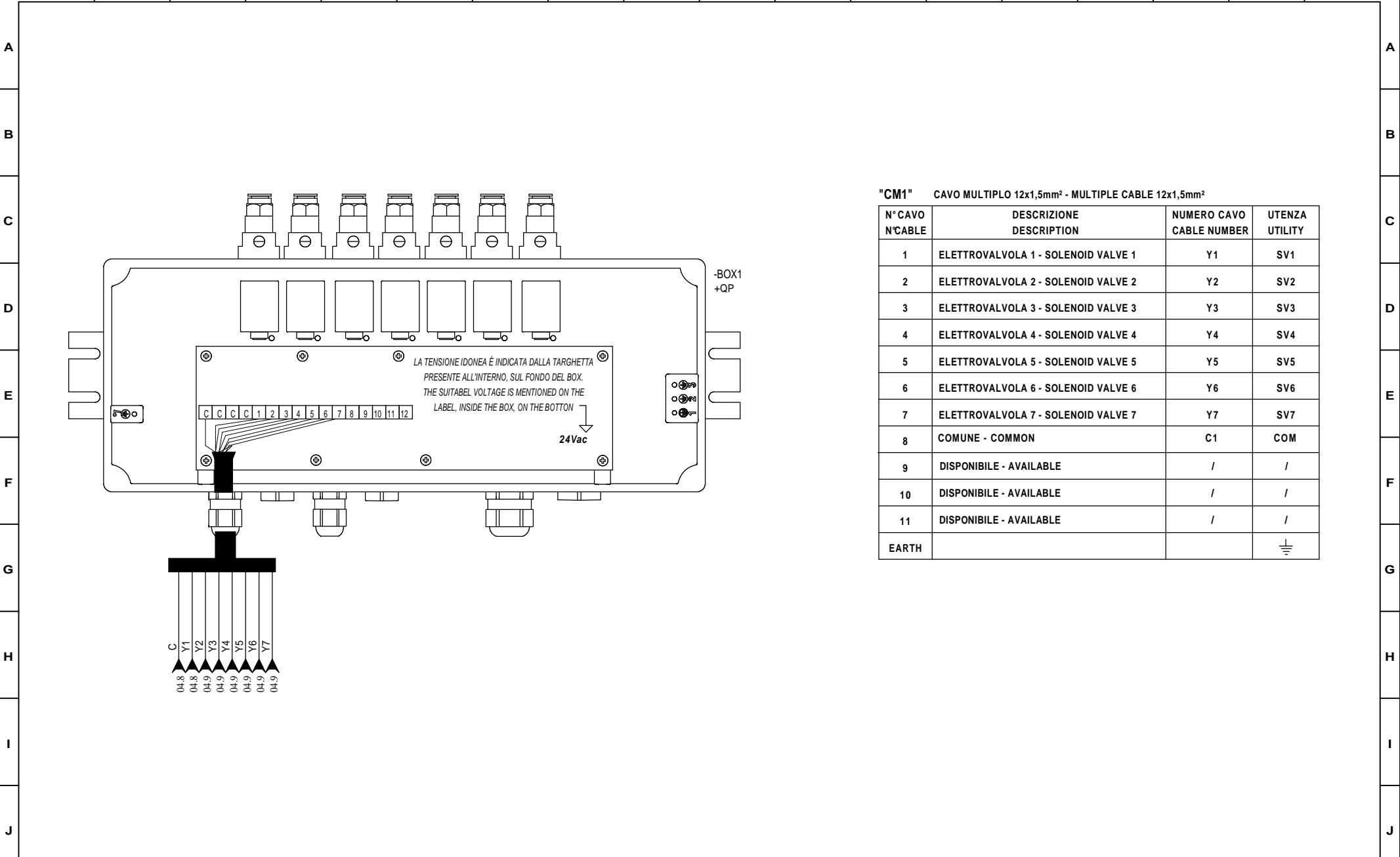
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"CM1" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N°CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 1 - SOLENOID VALVE 1	Y1	SV1
2	ELETTROVALVOLA 2 - SOLENOID VALVE 2	Y2	SV2
3	ELETTROVALVOLA 3 - SOLENOID VALVE 3	Y3	SV3
4	ELETTROVALVOLA 4 - SOLENOID VALVE 4	Y4	SV4
5	ELETTROVALVOLA 5 - SOLENOID VALVE 5	Y5	SV5
6	ELETTROVALVOLA 6 - SOLENOID VALVE 6	Y6	SV6
7	ELETTROVALVOLA 7 - SOLENOID VALVE 7	Y7	SV7
8	COMUNE - COMMON	C1	COM
9	DISPONIBILE - AVAILABLE	/	/
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
EARTH			—

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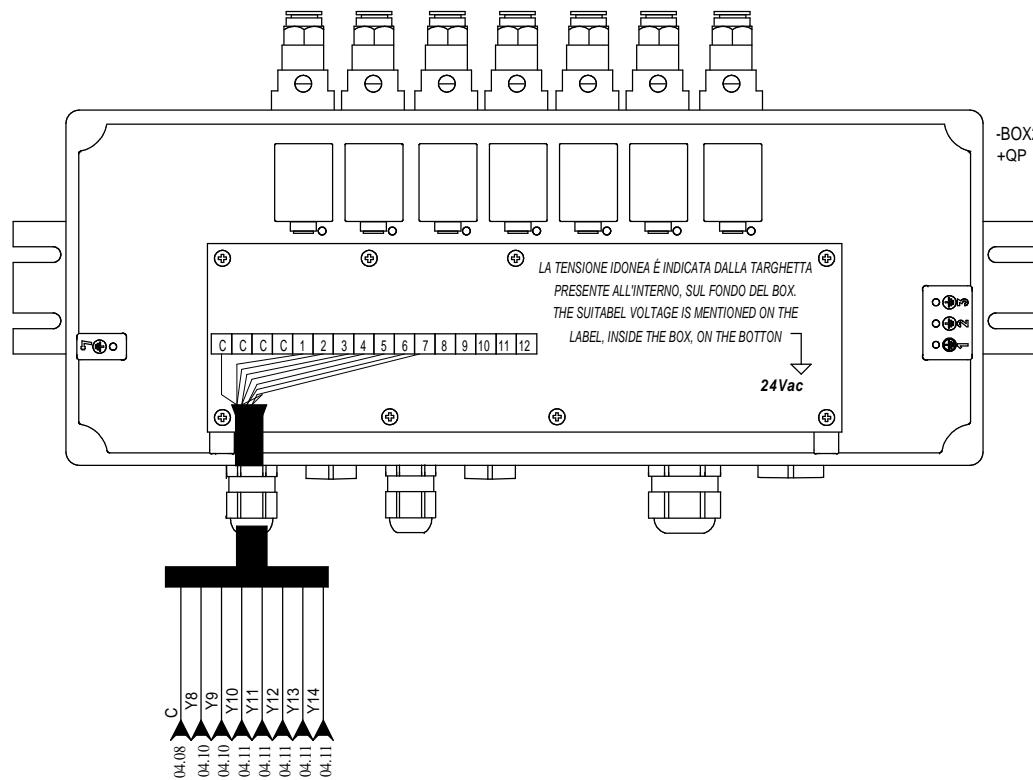
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"CM2" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 8 - SOLENOID VALVE 8	Y8	SV8
2	ELETTROVALVOLA 9 - SOLENOID VALVE 9	Y9	SV9
3	ELETTROVALVOLA 10 - SOLENOID VALVE 10	Y10	SV10
4	ELETTROVALVOLA 11 - SOLENOID VALVE 11	Y11	SV11
5	ELETTROVALVOLA 12 - SOLENOID VALVE 12	Y12	SV12
6	ELETTROVALVOLA 13 - SOLENOID VALVE 13	Y13	SV13
7	ELETTROVALVOLA 14 - SOLENOID VALVE 14	Y14	SV14
8	COMUNE - COMMON	C2	COM
9	DISPONIBILE - AVAILABLE	/	/
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
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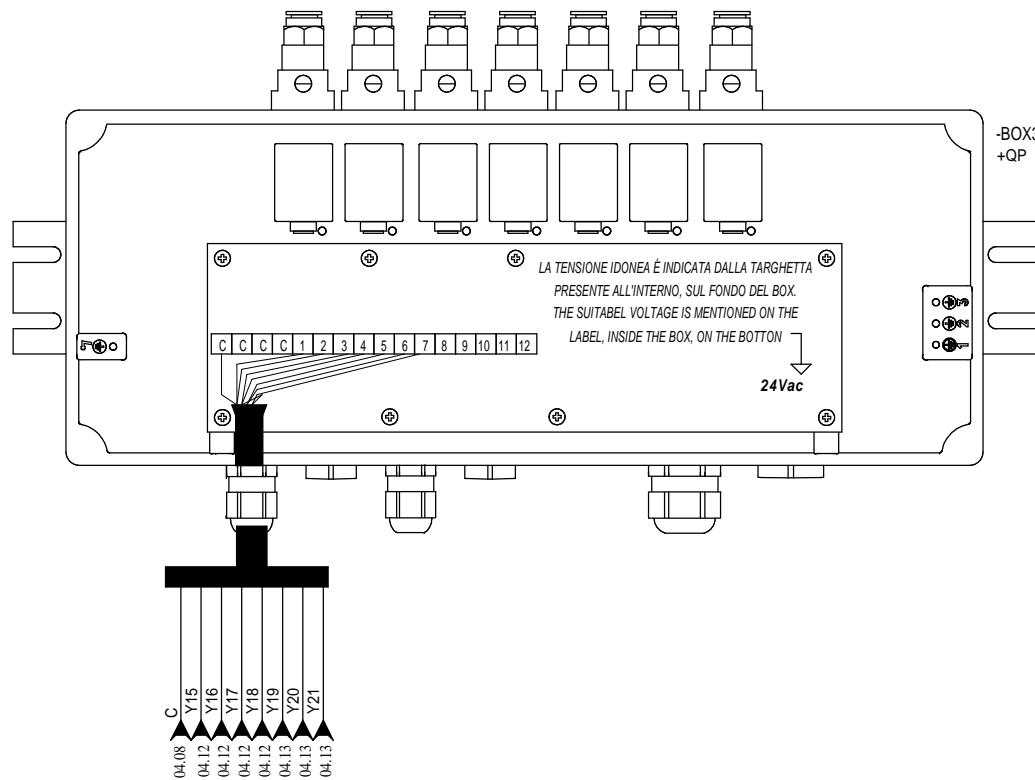
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"CM3" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 15 - SOLENOID VALVE 15	Y15	SV15
2	ELETTROVALVOLA 16 - SOLENOID VALVE 16	Y16	SV16
3	ELETTROVALVOLA 17 - SOLENOID VALVE 17	Y17	SV17
4	ELETTROVALVOLA 18 - SOLENOID VALVE 18	Y18	SV18
5	ELETTROVALVOLA 19 - SOLENOID VALVE 19	Y19	SV19
6	ELETTROVALVOLA 20 - SOLENOID VALVE 20	Y20	SV20
7	ELETTROVALVOLA 21 - SOLENOID VALVE 21	Y21	SV21
8	COMUNE - COMMON	C3	COM
9	DISPONIBILE - AVAILABLE	/	/
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
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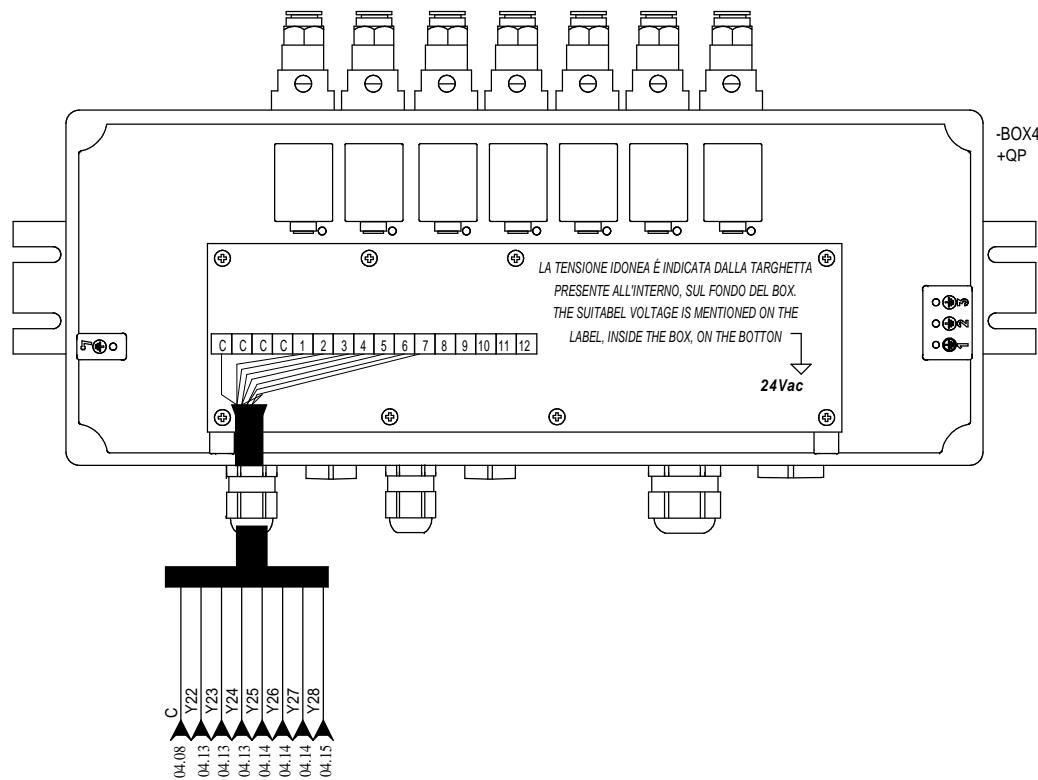
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"CM4" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 22 - SOLENOID VALVE 22	Y22	SV22
2	ELETTROVALVOLA 23 - SOLENOID VALVE 23	Y23	SV23
3	ELETTROVALVOLA 24 - SOLENOID VALVE 24	Y24	SV24
4	ELETTROVALVOLA 25 - SOLENOID VALVE 25	Y25	SV25
5	ELETTROVALVOLA 26 - SOLENOID VALVE 26	Y26	SV26
6	ELETTROVALVOLA 27 - SOLENOID VALVE 27	Y27	SV27
7	ELETTROVALVOLA 28 - SOLENOID VALVE 28	Y28	SV28
8	COMUNE - COMMON	C4	COM
9	DISPONIBILE - AVAILABLE	/	/
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
EARTH			$\frac{1}{2}$

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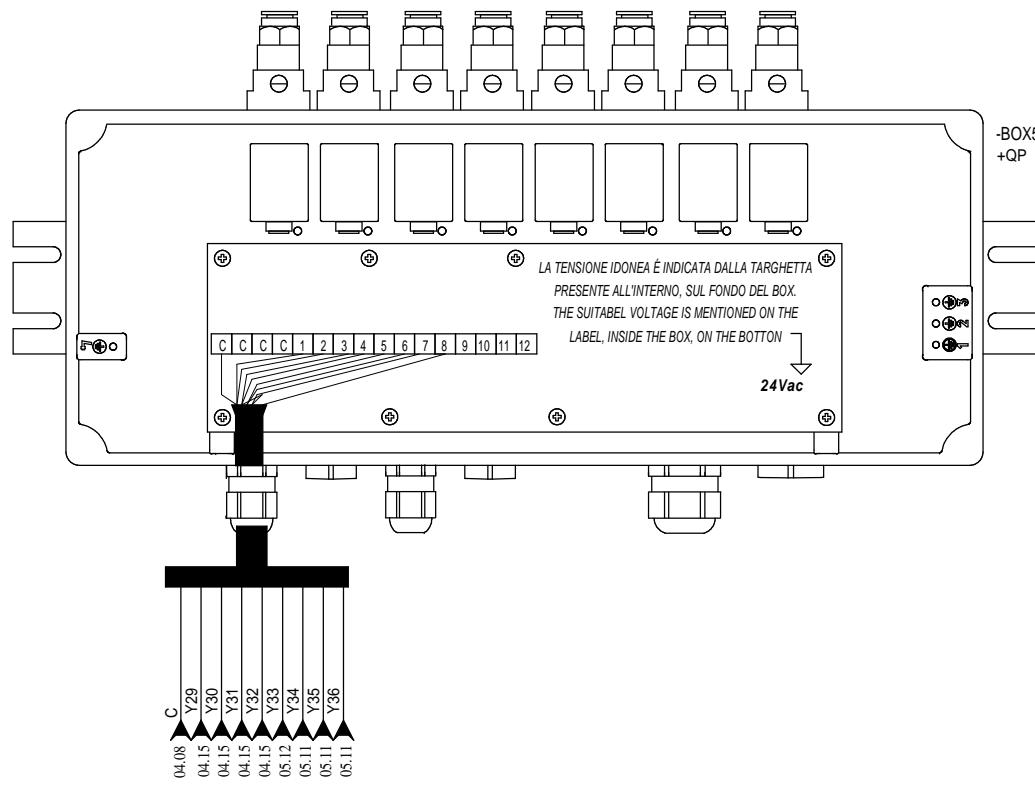
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"CM5" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 29 - SOLENOID VALVE 29	Y29	SV29
2	ELETTROVALVOLA 30 - SOLENOID VALVE 30	Y30	SV30
3	ELETTROVALVOLA 31 - SOLENOID VALVE 31	Y31	SV31
4	ELETTROVALVOLA 32 - SOLENOID VALVE 32	Y32	SV32
5	ELETTROVALVOLA 33 - SOLENOID VALVE 33	Y33	SV33
6	ELETTROVALVOLA 34 - SOLENOID VALVE 34	Y34	SV34
7	ELETTROVALVOLA 35 - SOLENOID VALVE 35	Y35	SV35
8	ELETTROVALVOLA 36 - SOLENOID VALVE 36	Y36	SV36
9	COMUNE - COMMON	C5	COM
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
EARTH			—

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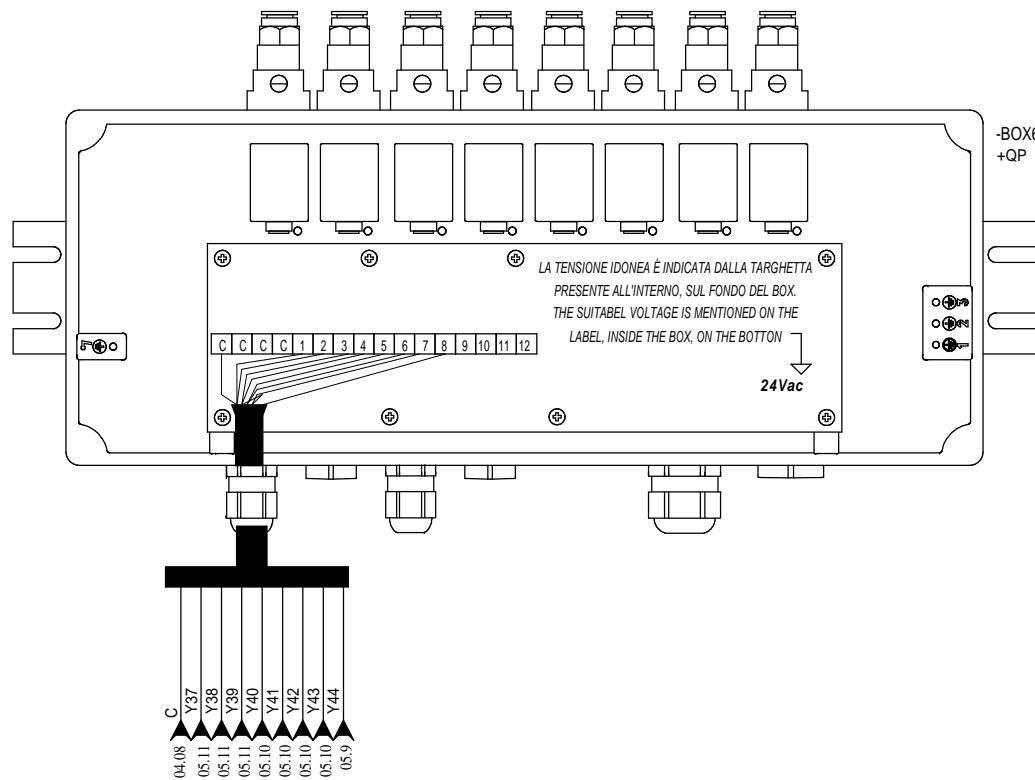
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"CM6" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N°CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 37 - SOLENOID VALVE 37	Y37	SV37
2	ELETTROVALVOLA 38 - SOLENOID VALVE 38	Y38	SV38
3	ELETTROVALVOLA 39 - SOLENOID VALVE 39	Y39	SV39
4	ELETTROVALVOLA 40 - SOLENOID VALVE 40	Y40	SV40
5	ELETTROVALVOLA 41 - SOLENOID VALVE 41	Y41	SV41
6	ELETTROVALVOLA 42 - SOLENOID VALVE 42	Y42	SV42
7	ELETTROVALVOLA 43 - SOLENOID VALVE 43	Y43	SV43
8	ELETTROVALVOLA 44 - SOLENOID VALVE 44	Y44	SV44
9	COMUNE - COMMON	C6	COM
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
EARTH			$\frac{1}{2}$

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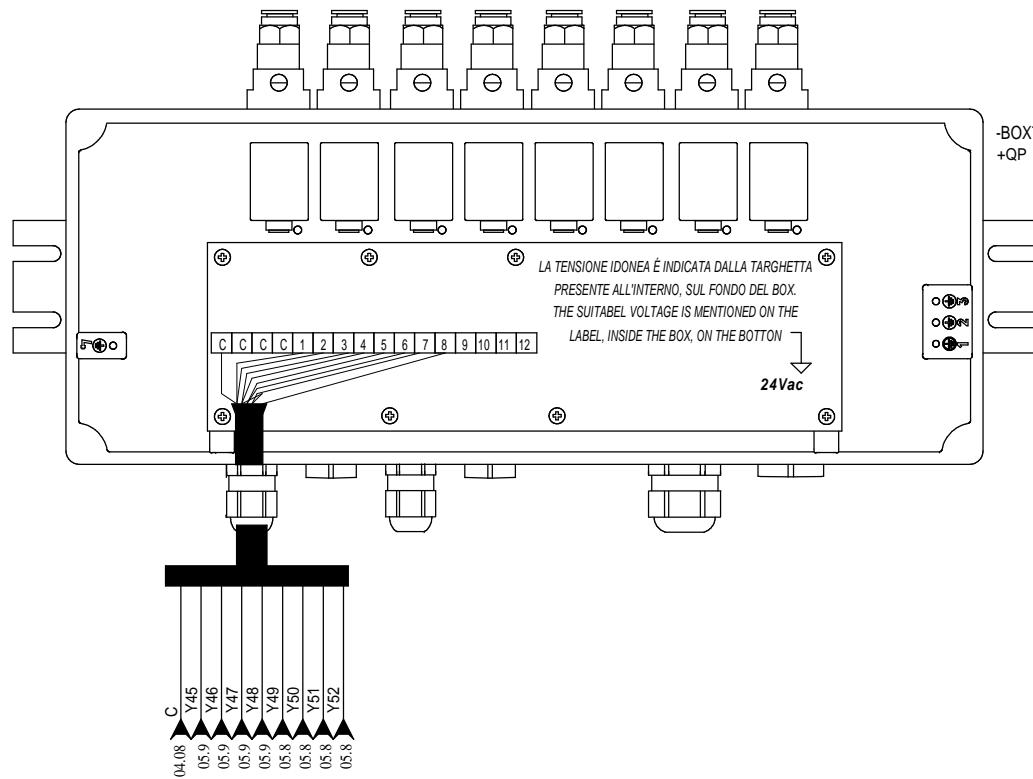
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"CM7" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 45 - SOLENOID VALVE 45	Y45	SV45
2	ELETTROVALVOLA 46 - SOLENOID VALVE 46	Y46	SV46
3	ELETTROVALVOLA 47 - SOLENOID VALVE 47	Y47	SV39
4	ELETTROVALVOLA 48 - SOLENOID VALVE 48	Y48	SV48
5	ELETTROVALVOLA 49 - SOLENOID VALVE 49	Y49	SV49
6	ELETTROVALVOLA 50 - SOLENOID VALVE 50	Y50	SV50
7	ELETTROVALVOLA 51 - SOLENOID VALVE 51	Y51	SV51
8	ELETTROVALVOLA 52 - SOLENOID VALVE 52	Y52	SV52
9	COMUNE - COMMON	C6	COM
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
EARTH			—

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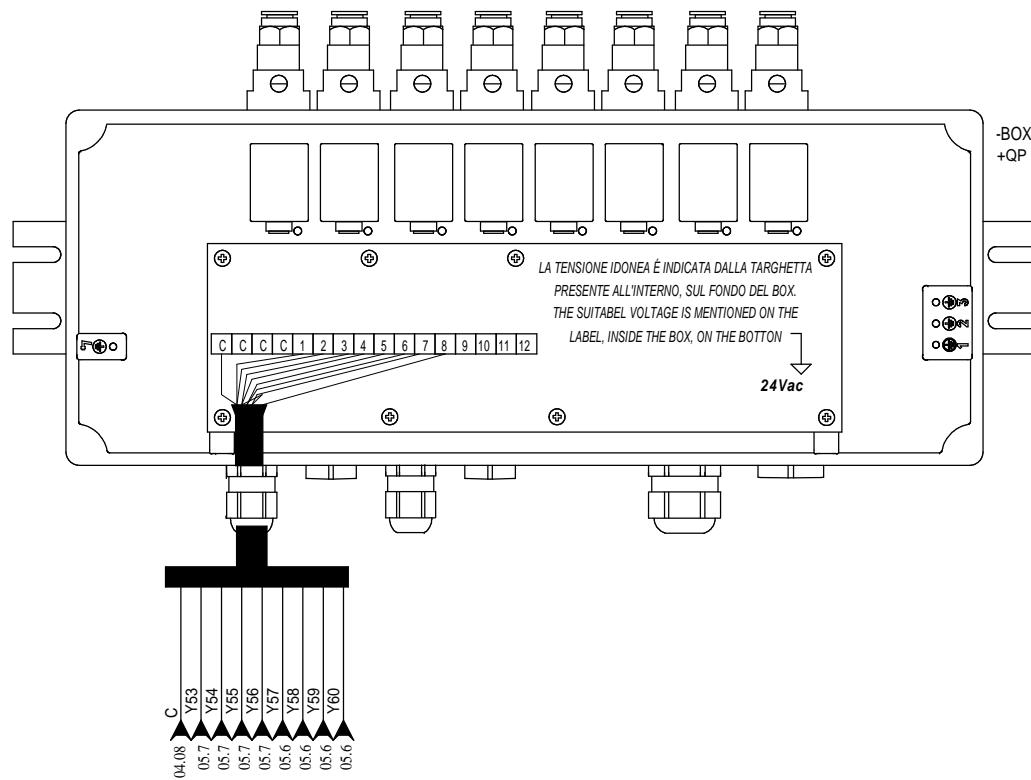
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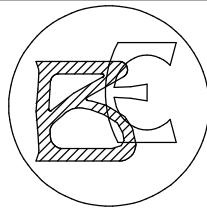


"CM8" CAVO MULTIPLO 12x1,5mm² - MULTIPLE CABLE 12x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 53 - SOLENOID VALVE 53	Y53	SV53
2	ELETTROVALVOLA 54 - SOLENOID VALVE 54	Y54	SV54
3	ELETTROVALVOLA 55 - SOLENOID VALVE 55	Y55	SV55
4	ELETTROVALVOLA 56 - SOLENOID VALVE 56	Y56	SV56
5	ELETTROVALVOLA 57 - SOLENOID VALVE 57	Y57	SV57
6	ELETTROVALVOLA 58 - SOLENOID VALVE 58	Y58	SV58
7	ELETTROVALVOLA 59 - SOLENOID VALVE 59	Y59	SV59
8	ELETTROVALVOLA 60 - SOLENOID VALVE 60	Y60	SV60
9	COMUNE - COMMON	C6	COM
10	DISPONIBILE - AVAILABLE	/	/
11	DISPONIBILE - AVAILABLE	/	/
EARTH			$\frac{1}{2}$

Project: Q.E. GESTIONE ECO20-NET E 19 ELETTROVALVOLE
 E.B. MANAGEMENT ECO20-NET AND 19 ELECTROVALVES
 Customer: BALLESTRA
 Job order: 994/36
 Reference: Fq 81032 - Job 1E35Z
 Note:

Power Supply:	110Vac
Power Anticondensation Resistance:	/
Power Solenoid Valve:	24Vac
Drw n°:	
	ITEM 64F2



BOLDROCCHI
ECOLOGIA

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 e-mail: boldrocchi@boldrocchi.eu

Rev.	Modifications	Date	Prepared	Verified
				Approved of

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
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A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		T	TRASFORMATORE TRANSFORMER		RT	TERMICA THERMAL		HL	LED LED	B
C		QF	INTERRUTTORE AUTOMATICO MAGNETOTERMICO DIFFERENZIALE DIFFERENTIAL MAGNETO-THERMAL AUTOMATIC SWITCH		RT	CONTATTI TERMICA THERMAL CONTACTS		HL	SEGNALAZIONE QUADRO IN TENSIONE ELECTRIC PANEL VOLTAGE SIGNALING	C
D		QF	INTERRUTTORE AUTOMATICO DIFFERENZIALE DIFFERENTIAL AUTOMATIC SWITCH		KM	CONTATTORE CONTACTOR		SBE	PULSANTE DI EMERGENZA NORMALMENTE CHIUSO EMERGENCY PUSH BUTTON NORMALLY CLOSED	D
E		QS	SEZIONATORE SECTIONALISING SWITCH		KM	CONTATTI DI POTENZA CONTATTORE CONTACTOR POWER CONTACTS		SB	PULSANTE STABILE NORMALMENTE CHIUSO STABLE PUSH BUTTON NORMALLY CLOSED	E
F		QS	SEZIONATORE CON FUSIBILI SECTIONALISING SWITCH WITH FUSES		KM	CONTATTI AUSILIARI CONTATTORE CONTACTOR AUXILIARIES CONTACTS		SB	PULSANTE STABILE NORMALMENTE APERTO STABLE PUSH BUTTON NORMALLY OPENED	F
G		QS	INTERRUTTORE-SEZIONATORE AUTOMATICO AUTOMATIC SECTIONALISING SWITCH		KA	RELÉ RELAY		SA	SELETTORE DUE POSIZIONI (0-1) TWO POSITION SELECTOR (0-1)	G
H		F	PORAFUSIBILE NON SEZIONABILE NOT SECTIONABLE FUSE-CARRIER		KA	CONTATTI RELÉ RELAY CONTACTS		SA	SELETTORE A CHIAVE DUE POSIZIONI (0-1) TWO POSITION SELECTOR KEY (0-1)	H
I		F	PORAFUSIBILE SEZIONABILE SECTIONABLE FUSE-CARRIER		KT	TEMPORIZZATORE TIMER		SA	SELETTORE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR (1-0-2)	I
J		F	PORAFUSIBILE SEZIONABILE + NEUTRO SECTIONABLE FUSE-CARRIER + NEUTRAL		KT	CONTATTI TEMPORIZZATORE TIMER CONTACTS		SA	SELETTORE A CHIAVE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR KEY (1-0-2)	J
		Q	MAGNETOTERMICO MAGNETO-THERMAL		HL	LAMPADA LAMPEGGIANTE FLASHING LAMP		HA	SIRENA SIRENE	
		Q	CONTATTI MAGNETOTERMICO MAGNETO-THERMAL CONTACTS		HL	LAMPADA LAMP		HA	SUONERIA BUZZER	



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REV DATE SIGN MODIFICATION

CUSTOMER:
BALLESTRA
JOB ORDER:
994/36
DWG No:
ITEM 64F2

PROJECT: **994_36-R10**
DATE: 06/09/2010 DES.: P.P.
REF: **Fq 81032 - Job 1E35Z**
SUBJECT: Q.E. GESTIONE ECO20-NET E 19 ELETROVALVOLE
E.B. MANAGEMENT ECO20-NET AND 19 ELECTROVALVES
TITLE: AIR INTAKE ELECTRIC BOARDS WIRING DIAGRAM & LAYOUT

02
OF 08
01 ▶ 03

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A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		SQ	FINECORSO LIMIT SWITCH		P	AMPEROMETRO AMMETER		G	ALIMENTATORE FEEDER	B
		BF	FOTOCELLULA A RIFLESSIONE PHOTOCELL TO REFLECTION		P	VOLTMETRO VOLTMETER		YV	ELETTROVALVOLA MONOSTABILE MONOSTABLE SOLENOID VALVE	C
		SQ	SENSORE MAGNETICO MAGNETIC SENSOR		R	RESISTENZA RESISTANCE		YV	ELETTROVALVOLA BISTABILE BISTABLE SOLENOID VALVE	D
		SQ	SENSORE DI PROSSIMITA' PROXIMITY SENSOR		R	POTENZIOMETRO POTENTIOMETER		V	VENTOLA PER RAFFREDDAMENTO Q.E. E.B. COOLING FAN	E
		SP	PRESSOSTATO PRESSURE SWITCH		R	GRUPPO RC RC GROUP		M	MOTORE MONOFASE MONO-PHASE MOTOR	F
		ST	TERMOSTATO THERMOSTAT		R	VARISTORE VARISTOR		M	MOTORE TRIFASE THREE-PHASE MOTOR	G
		S	GALLEGGIANTE FLOATING		L	INDUTTANZA INDUCTANCE		M	MOTORE STELLA/TRIANGolo S/T MOTOR	H
		P	OROLOGIO CLOCK		XS	PRESA INTAKE		U	FRENO BRAKE	I
		P	CONTATTI OROLOGIO CLOCK CONTACTS		XS	PRESA INDUSTRIALE 1P+N+T INDUSTRIAL INTAKE 1P+N+T		X	MORSETTO TERMINAL	J
		C	CONTATORE DI IMPULSI IMPULSES COUNT		XS	PRESA INDUSTRIALE 2P+N+T INDUSTRIAL INTAKE 2P+N+T		PE	BARRA DI TERRA EARTH BAR	
		TA	TRASFORMATORE AMPEROMETRICO AMMETER TRANSFORMER		E	NEON NEON		PE	TERRA EARTH	



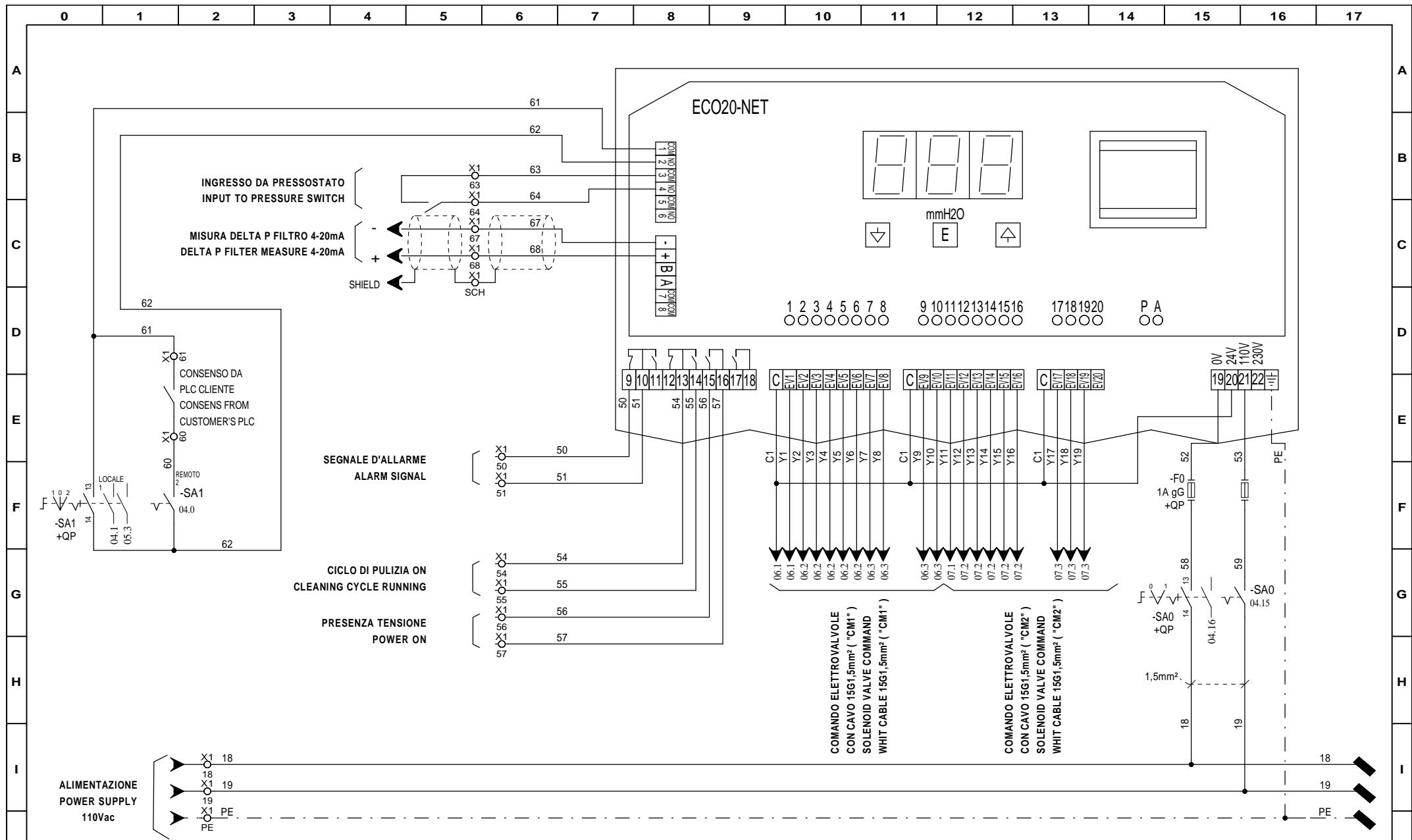
V.LE TRENTO E TRIESTE N°93
20046 BIASONO (MI) ITALY
Tel. 039-039 22021 Fax 039-039 2753498
e-mail: boldrrochi@boldrrochi.eu

REV	DATE	SIGN	MODIFICATION

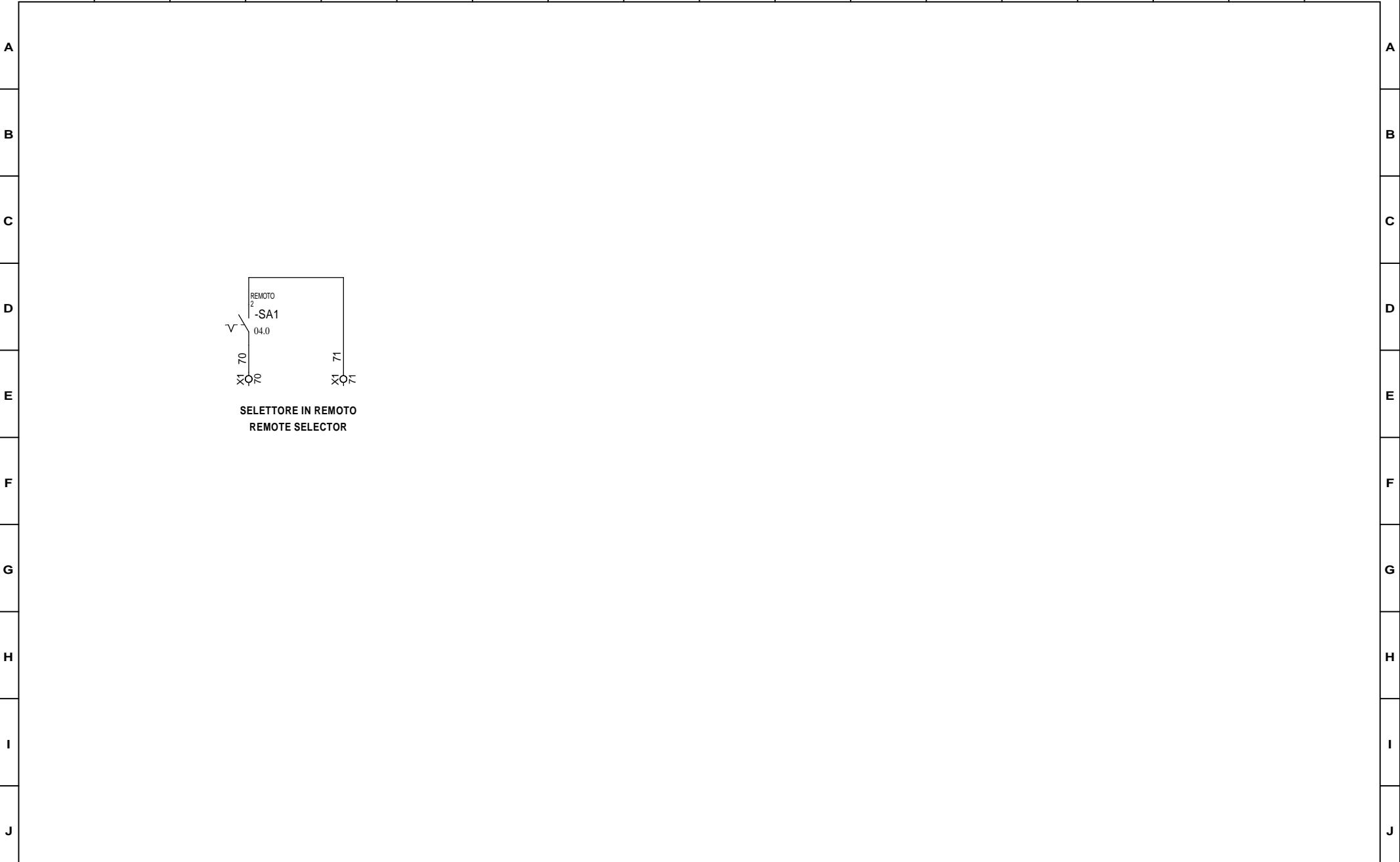
CUSTOMER:
BALLESTRA
DWG No:
ITEM 64F2

PROJECT: 994_36-R10
JOB ORDER: 994/36
SUBJECT: Q.E. GESTIONE ECO20-NET E 19 ELETTROVALVOLE
E.B. MANAGEMENT ECO20-NET AND 19 ELECTROVALVES
TITLE: AIR INTAKE ELECTRIC BOARDS WIRING DIAGRAM & LAYOUT

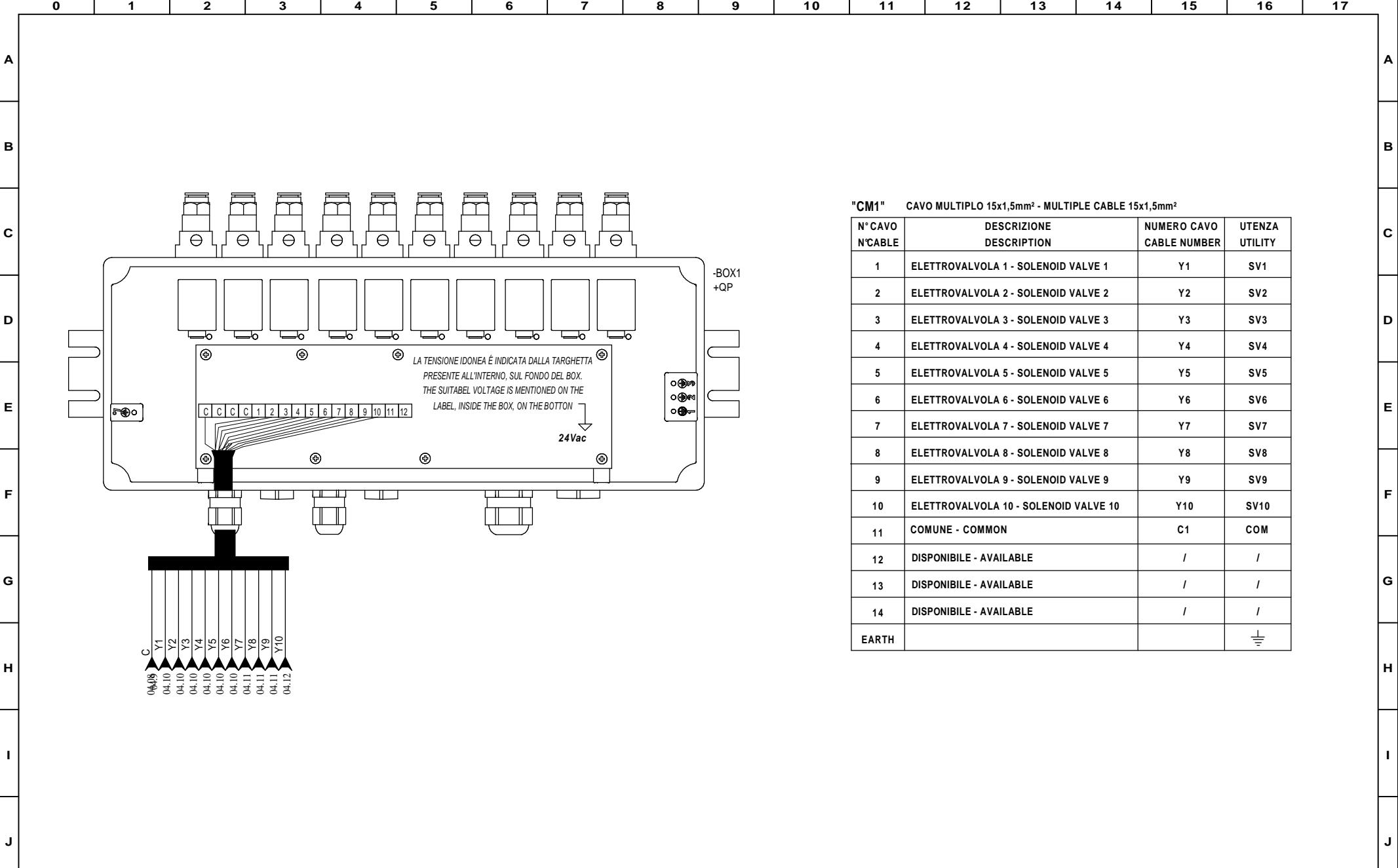
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REF: Fq 81032 - Job 1E352 OF 08
02 ▶ 04



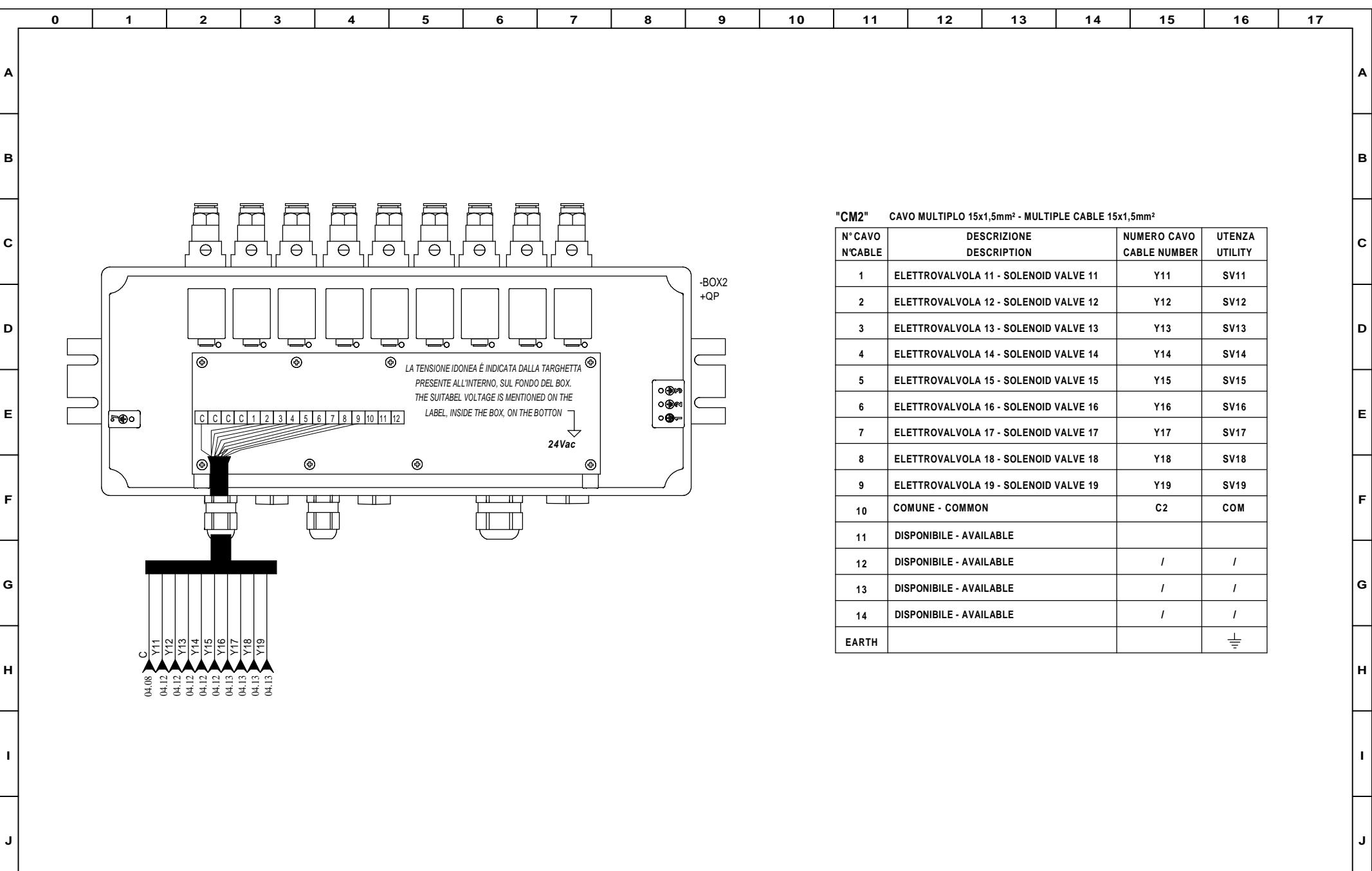
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Project: Q.E. GESTIONE ECO12-NET E 5 ELETTROVALVOLE
E.B. MANAGEMENT ECO12-NET AND 5 ELECTROVALVES

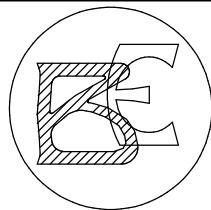
Customer: BALLESTRA

Job order: 994/37

Reference: Fq 81032 - Job 1E35Z

Note:

Power Supply:	110Vac
Power Anticondensation Resistance:	/
Power Solenoid Valve:	24Vac
Drw n°:	ITEM 62F1 - 62F2 - 62F4 62F5 - 65F2 - 65F9 - 64F3



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e-mail: boldrocchi@boldrocchi.eu

Rev.	Modifications	Date	Prepared	Verified	Approved of

A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		T	TRASFORMATORE TRANSFORMER		RT	TERMICA THERMAL		HL	LED LED	B
C		QF	INTERRUTTORE AUTOMATICO MAGNETOTERMICO DIFFERENZIALE DIFFERENTIAL MAGNETO-THERMAL AUTOMATIC SWITCH		RT	CONTATTI TERMICA THERMAL CONTACTS		HL	SEGNALAZIONE QUADRO IN TENSIONE ELECTRIC PANEL VOLTAGE SIGNALING	C
D		QF	INTERRUTTORE AUTOMATICO DIFFERENZIALE DIFFERENTIAL AUTOMATIC SWITCH		KM	CONTATTORE CONTACTOR		SBE	PULSANTE DI EMERGENZA NORMALMENTE CHIUSO EMERGENCY PUSH BUTTON NORMALLY CLOSED	D
E		QS	SEZIONATORE SECTIONALISING SWITCH		KM	CONTATTI DI POTENZA CONTATTORE CONTACTOR POWER CONTACTS		SB	PULSANTE STABILE NORMALMENTE CHIUSO STABLE PUSH BUTTON NORMALLY CLOSED	E
F		QS	SEZIONATORE CON FUSIBILI SECTIONALISING SWITCH WITH FUSES		KM	CONTATTI AUSILIARI CONTATTORE CONTACTOR AUXILIARIES CONTACTS		SB	PULSANTE STABILE NORMALMENTE APERTO STABLE PUSH BUTTON NORMALLY OPENED	F
G		QS	INTERRUTTORE-SEZIONATORE AUTOMATICO AUTOMATIC SECTIONALISING SWITCH		KA	RELÉ RELAY		SA	SELETTORE DUE POSIZIONI (0-1) TWO POSITION SELECTOR (0-1)	G
H		F	PORTAFUSIBILE NON SEZIONABILE NOT SECTIONABLE FUSE-CARRIER		KA	CONTATTI RELÉ RELAY CONTACTS		SA	SELETTORE A CHIAVE DUE POSIZIONI (0-1) TWO POSITION SELECTOR KEY (0-1)	H
I		F	PORTAFUSIBILE SEZIONABILE SECTIONABLE FUSE-CARRIER		KT	TEMPORIZZATORE TIMER		SA	SELETTORE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR (1-0-2)	I
J		F	PORTAFUSIBILE SEZIONABILE + NEUTRO SECTIONABLE FUSE-CARRIER + NEUTRAL		KT	CONTATTI TEMPORIZZATORE TIMER CONTACTS		SA	SELETTORE A CHIAVE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR KEY (1-0-2)	J
		Q	MAGNETOTERMICO MAGNETO-THERMAL		HL	LAMPADA LAMPEGGIANTE FLASHING LAMP		HA	SIRENA SIRENE	
		Q	CONTATTI MAGNETOTERMICO MAGNETO-THERMAL CONTACTS		HL	LAMPADA LAMP		HA	SUONERIA BUZZER	

A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		SQ	FINECORSÀ LIMIT SWITCH		P	AMPEROMETRO AMMETER		G	ALIMENTATORE FEEDER	B
C		BF	FOTOCELLULA A RIFLESSIONE PHOTOCELL TO REFLECTION		P	VOLTMETRO VOLTMETER		YV	ELETTOVALVOLA MONOSTABILE MONOSTABLE SOLENOID VALVE	C
D		SQ	SENSORE MAGNETICO MAGNETIC SENSOR		R	RESISTENZA RESISTANCE		YV	ELETTOVALVOLA BISTABILE BISTABLE SOLENOID VALVE	D
E		SQ	SENSORE DI PROSSIMITÀ PROXIMITY SENSOR		R	POTENZIOMETRO POTENTIOMETER		V	VENTOLA PER RAFFREDDAMENTO Q.E. E.B. COOLING FAN	E
F		SP	PRESSOSTATO PRESSURE SWITCH		R	GRUPPO RC RC GROUP		M	MOTORE MONOFASE MONO-PHASE MOTOR	F
G		ST	TERMOSTATO THERMOSTAT		R	VARISTORE VARISTOR		M	MOTORE TRIFASE THREE-PHASE MOTOR	G
H		S	GALLEGGIANTE FLOATING		L	INDUTTANZA INDUCTANCE		M	MOTORE STELLA/TRIANGolo S/T MOTOR	H
I		P	OROLOGIO CLOCK		XS	PRESA INTAKE		U	FRENO BRAKE	I
J		P	CONTATTI OROLOGIO CLOCK CONTACTS		XS	PRESA INDUSTRIALE 1P+N+T INDUSTRIAL INTAKE 1P+N+T		X	MORSETTO TERMINAL	J
		C	CONTATTORE DI IMPULSI IMPULSES COUNT		XS	PRESA INDUSTRIALE 2P+N+T INDUSTRIAL INTAKE 2P+N+T		PE	BARRA DI TERRA EARTH BAR	
	TA		TRASFORMATORE AMPEROMETRICO AMMETER TRANSFORMER		E	NEON NEON		PE	TERRA EARTH	

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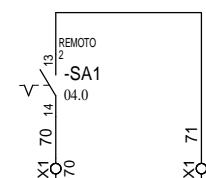
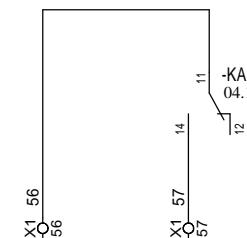
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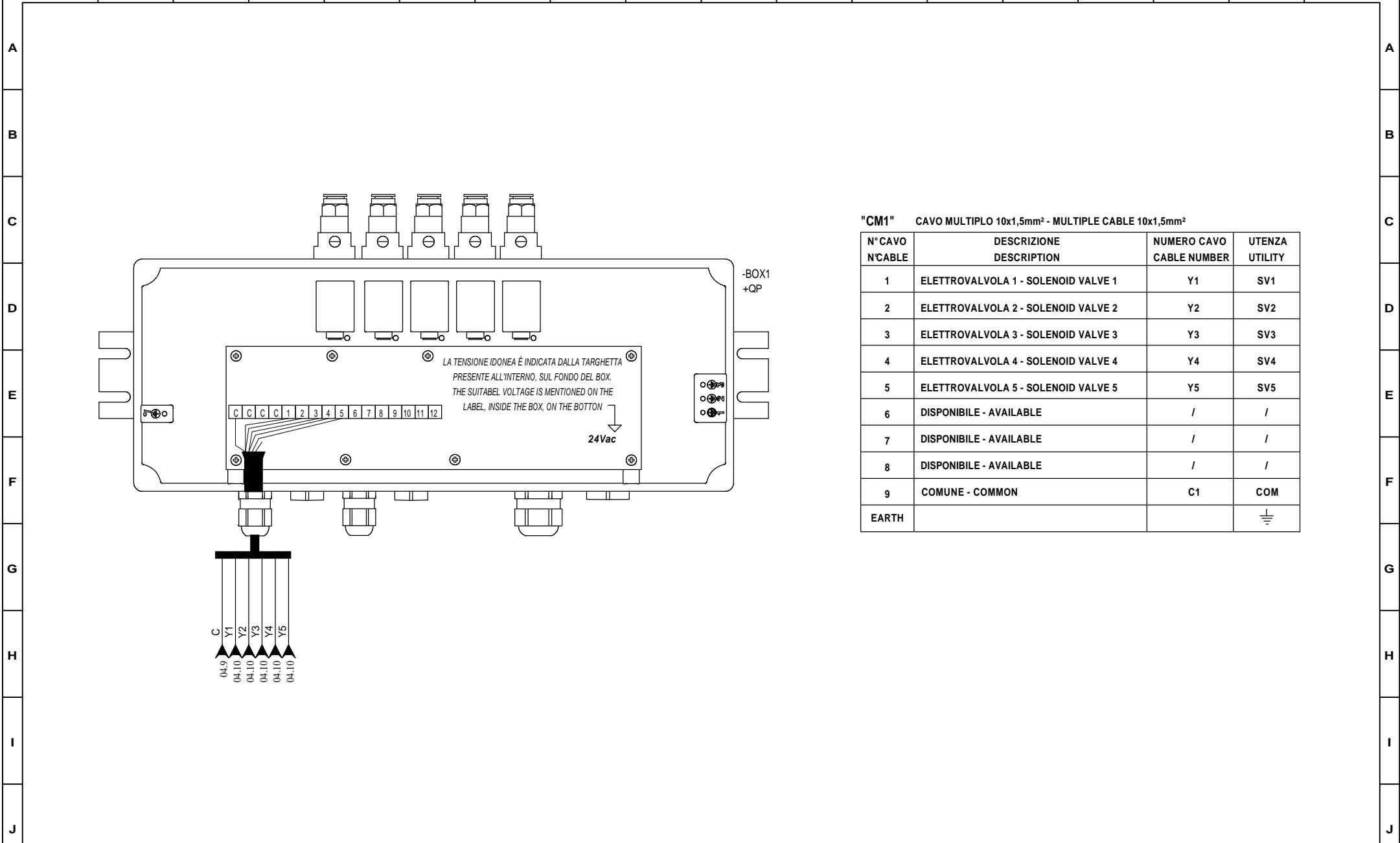
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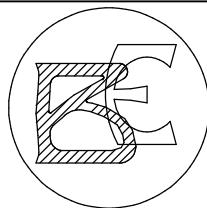
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Project: Q.E. GESTIONE ECO12-NET E 3 ELETTROVALVOLE
 E.B. MANAGEMENT ECO12-NET AND 3 ELECTROVALVES
 Customer: BALLESTRA
 Job order: 994/38
 Reference: Fq 81032 - Job 1E35Z
 Note:

Power Supply:	110Vac
Power Anticondensation Resistance:	/
Power Solenoid Valve:	24Vac
Drw n°:	ITEM 65F6 - 65F7 - 65F8 65F11 - 62F3 - 65F10



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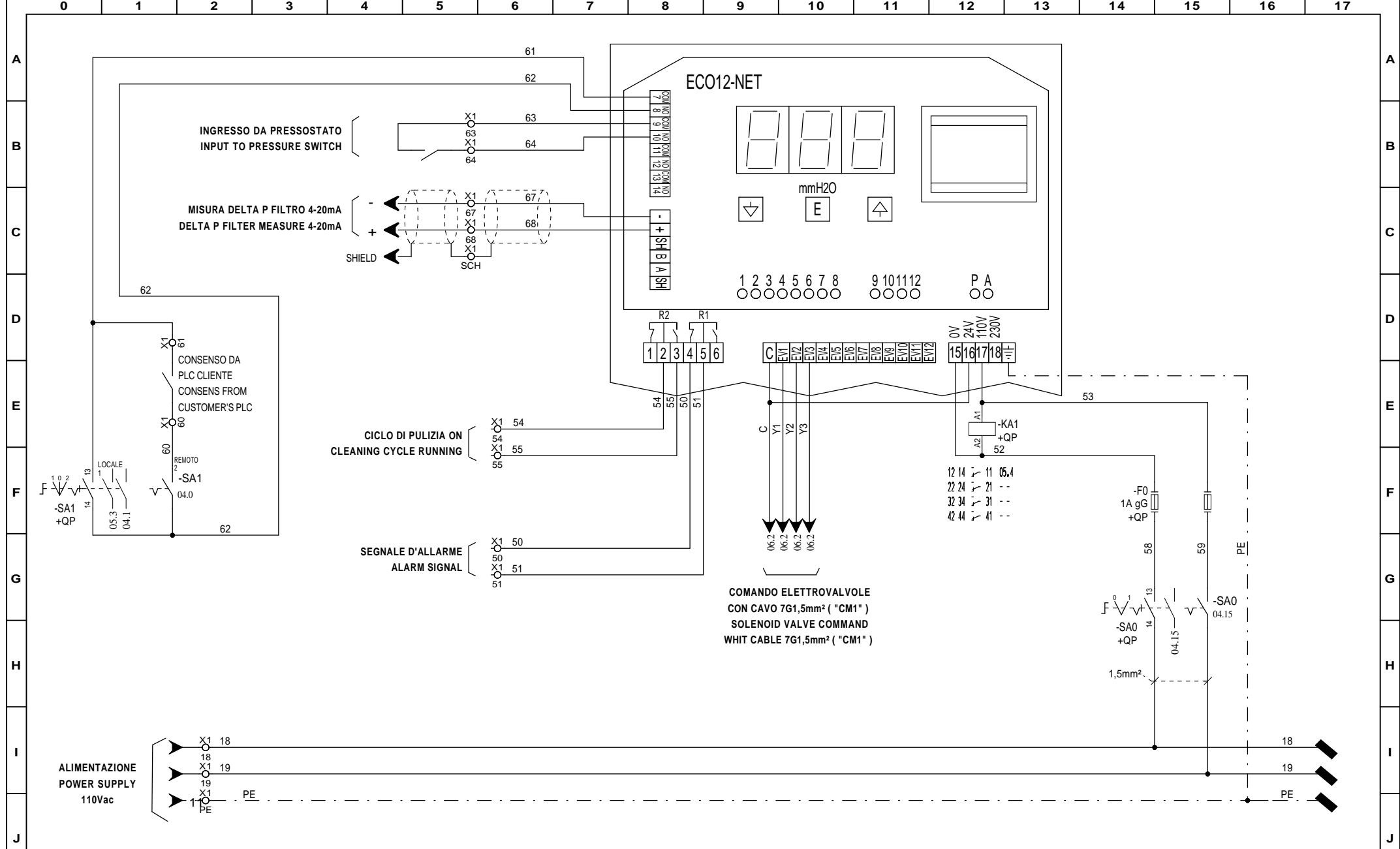
Rev.	Modifications	Date	Prepared	Verified
				Approved of

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A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A								
B		T	TRASFORMATORE TRANSFORMER		RT	TERMICA THERMAL		HL	LED LED	B								
C		QF	INTERRUTTORE AUTOMATICO MAGNETOTERMICO DIFFERENZIALE DIFFERENTIAL MAGNETO-THERMAL AUTOMATIC SWITCH		RT	CONTATTI TERMICA THERMAL CONTACTS		HL	SEGNALAZIONE QUADRO IN TENSIONE ELECTRIC PANEL VOLTAGE SIGNALING	C								
D		QF	INTERRUTTORE AUTOMATICO DIFFERENZIALE DIFFERENTIAL AUTOMATIC SWITCH		KM	CONTATTORI CONTACTORS		SBE	PULSANTE DI EMERGENZA NORMALMENTE CHIUSO EMERGENCY PUSH BUTTON NORMALLY CLOSED	D								
E		QS	SEZIONATORE SECTIONALISING SWITCH		KM	CONTATTI DI POTENZA CONTATTORI CONTACTOR POWER CONTACTS		SB	PULSANTE STABILE NORMALMENTE CHIUSO STABLE PUSH BUTTON NORMALLY CLOSED	E								
F		QS	SEZIONATORE CON FUSIBILI SECTIONALISING SWITCH WITH FUSES		KM	CONTATTI AUSILIARI CONTATTORI CONTACTOR AUXILIARIES CONTACTS		SB	PULSANTE STABILE NORMALMENTE APERTO STABLE PUSH BUTTON NORMALLY OPENED	F								
G		QS	INTERRUTTORE-SEZIONATORE AUTOMATICO AUTOMATIC SECTIONALISING SWITCH		KA	RELÉ RELAY		SA	SELETTORE DUE POSIZIONI (0-1) TWO POSITION SELECTOR (0-1)	G								
H		F	PORAFUSIBILE NON SEZIONABILE NOT SECTIONABLE FUSE-CARRIER		KA	CONTATTI RELÉ RELAY CONTACTS		SA	SELETTORE A CHIAVE DUE POSIZIONI (0-1) TWO POSITION SELECTOR KEY (0-1)	H								
I		F	PORAFUSIBILE SEZIONABILE SECTIONABLE FUSE-CARRIER		KT	TEMPORIZZATORE TIMER		SA	SELETTORE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR (1-0-2)	I								
J		F	PORAFUSIBILE SEZIONABILE + NEUTRO SECTIONABLE FUSE-CARRIER + NEUTRAL		KT	CONTATTI TEMPORIZZATORE TIMER CONTACTS		SA	SELETTORE A CHIAVE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR KEY (1-0-2)	J								
K		Q	MAGNETOTERMICO MAGNETO-THERMAL		HL	LAMPADA LAMPEGGIANTE FLASHING LAMP		HA	SIRENA SIRENE	K								
L		Q	CONTATTI MAGNETOTERMICO MAGNETO-THERMAL CONTACTS		HL	LAMPADA LAMP		HA	SUONERIA BUZZER	L								

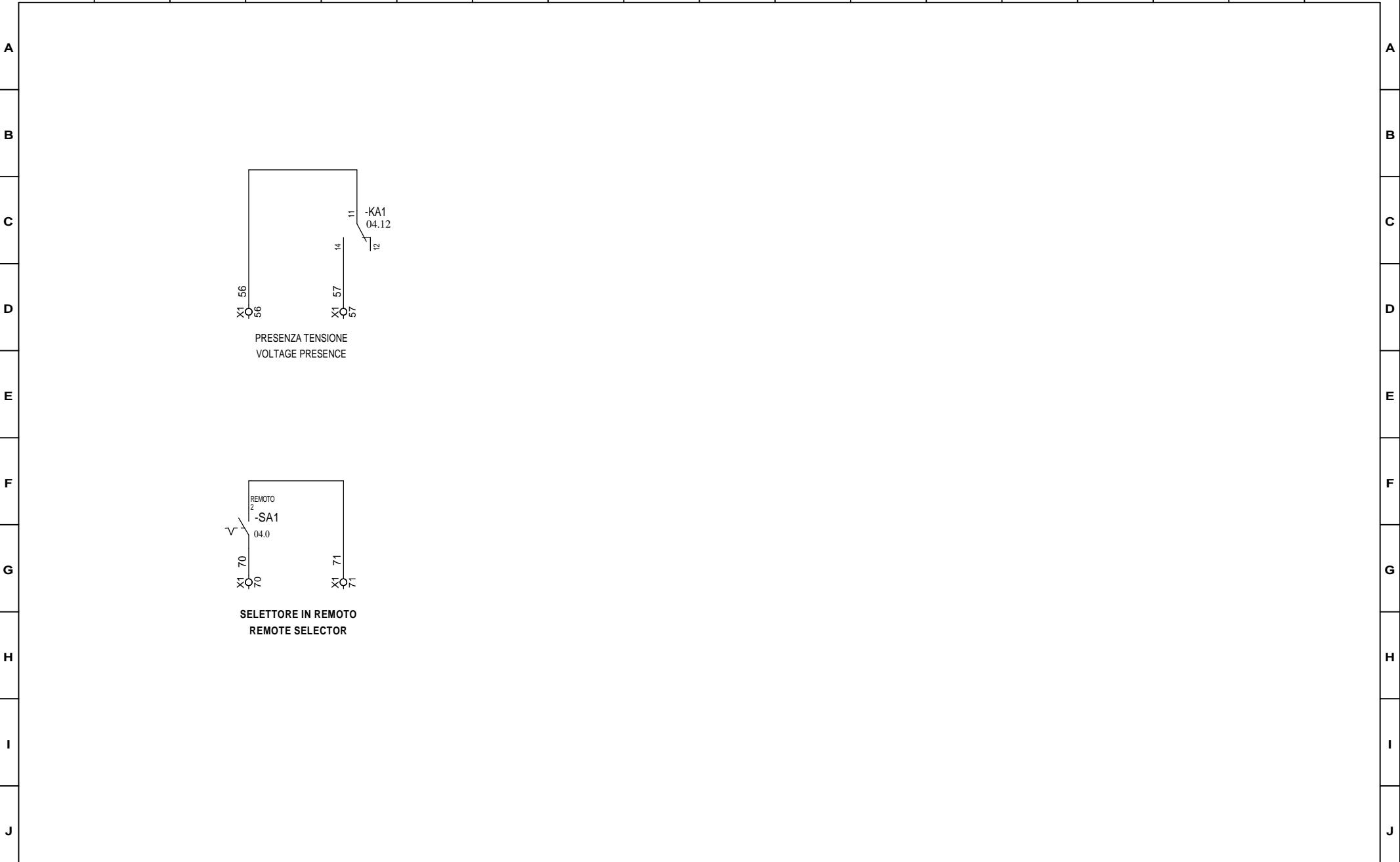
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B		SQ	FINECORSÀ LIMIT SWITCH		P	AMPEROMETRO AMMETER		G	ALIMENTATORE FEEDER	B
C		BF	FOTOCELLULA A RIFLESSIONE PHOTOCELL TO REFLECTION		P	VOLTMETRO VOLTMETER		YV	ELETTROVALVOLA MONOSTABILE MONOSTABLE SOLENOID VALVE	C
D		SQ	SENSORE MAGNETICO MAGNETIC SENSOR		R	RESISTENZA RESISTANCE		YV	ELETTROVALVOLA BISTABILE BISTABLE SOLENOID VALVE	D
E		SQ	SENSORE DI PROSSIMITÀ PROXIMITY SENSOR		R	POTENZIOMETRO POTENTIOMETER		V	VENTOLA PER RAFFREDDAMENTO Q.E. E.B. COOLING FAN	E
F		SP	PRESSOSTATO PRESSURE SWITCH		R	GRUPPO RC RC GROUP		M	MOTORE MONOFASE MONO-PHASE MOTOR	F
G		ST	TERMOSTATO THERMOSTAT		R	VARISTORE VARISTOR		M	MOTORE TRIFASE THREE-PHASE MOTOR	G
H		S	GALLEGGIANTE FLOATING		L	INDUTTANZA INDUCTANCE		M	MOTORE STELLA/TRIANGolo S/T MOTOR	H
I		P	OROLOGIO CLOCK		XS	PRESA INTAKE		U	FRENO BRAKE	I
J		P	CONTATTI OROLOGIO CLOCK CONTACTS		XS	PRESA INDUSTRIALE 1P+N+T INDUSTRIAL INTAKE 1P+N+T		X	MORSETTO TERMINAL	J
		C	CONTATORE DI IMPULSI IMPULSES COUNT		XS	PRESA INDUSTRIALE 2P+N+T INDUSTRIAL INTAKE 2P+N+T		PE	BARRA DI TERRA EARTH BAR	
		TA	TRASFORMATORE AMPEROMETRICO AMMETER TRANSFORMER		E	NEON NEON		PE	TERRA EARTH	

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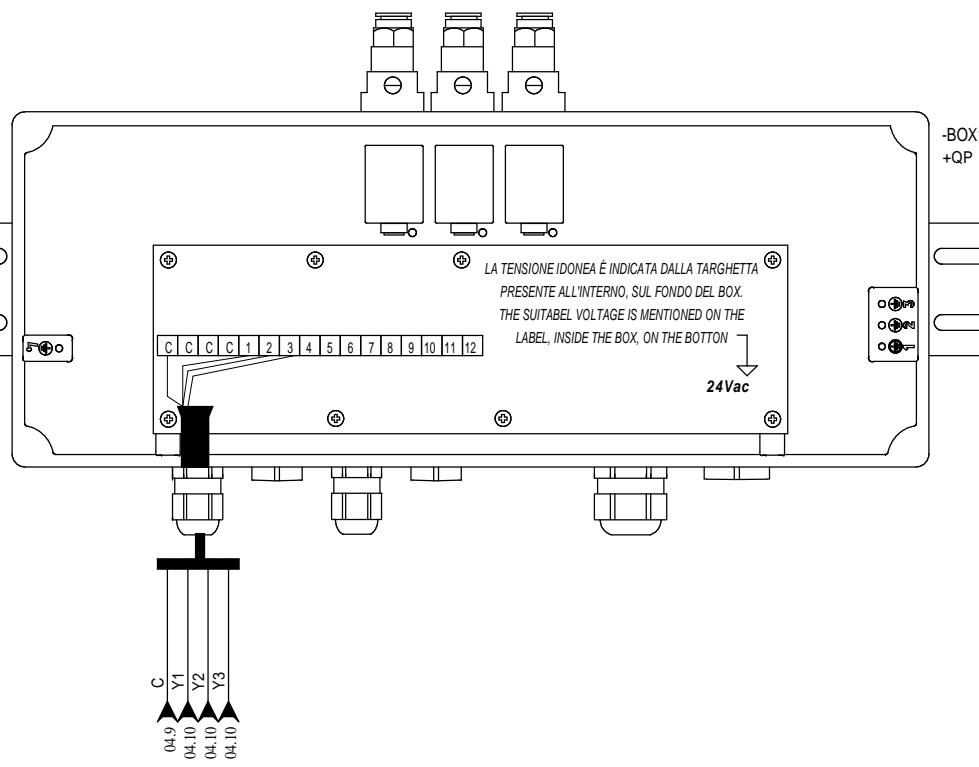
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"CM1" CAVO MULTIPLO 7x1,5mm² - MULTIPLE CABLE 7x1,5mm²

N° CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETTROVALVOLA 1 - SOLENOID VALVE 1	Y1	SV1
2	ELETTROVALVOLA 2 - SOLENOID VALVE 2	Y2	SV2
3	ELETTROVALVOLA 3 - SOLENOID VALVE 3	Y3	SV3
4	DISPONIBILE - AVAILABLE	/	/
5	DISPONIBILE - AVAILABLE	/	/
6	COMUNE - COMMON	C1	COM
EARTH			$\frac{1}{2}$

X1

	DESCRIZIONE DESTINAZIONE	DESTIN.	SEZIONE	ORIGIN	DESCRIZIONE ORIGINE
		DESTIN.	SEZIONE	ORIGIN	
		—	—	—	—
ALIMENTAZIONE 110vac	POWER SUPPLY 110vac	Ø	Ø	4mm²	
ALIMENTAZIONE 0/act10	POWER SUPPLY 0/act10	Ø	Ø	2.5mm²	
ALIMENTAZIONE 0/act10	POWER SUPPLY 0/act10	Ø	Ø	2.5mm²	
SEGNALE DI ALLARME	ALARM SIGNAL	Ø	18	18	
SEGNALE DI ALLARME	ALARM SIGNAL	Ø	19	19	
SEGNALE DI ALLARME	ALARM SIGNAL	Ø	50	50	ECO12-NET
CICLO DI PULIZIA ON	CICLO DI PULIZIA ON	Ø	51	51	ECO12-NET
CLEANING CYCLE RUNNING	CLEANING CYCLE RUNNING	Ø	54	54	ECO12-NET
VOLTAGE PRESENCE	VOLTAGE PRESENCE	Ø	55	55	ECO12-NET
PRESenza TENSIONE	PRESenza TENSIONE	Ø	56	56	ECO12-NET
PRESenza TENSIONE	PRESenza TENSIONE	Ø	57	57	KA1
VOLTAGE PRESENCE	VOLTAGE PRESENCE	Ø	60	60	2.5mm²
CONSENSO DA PLC/CLIENTE	CONSENSO FROM CUSTOMER/PLC	Ø	61	61	2.5mm²
CONSENSO DA PLC/CLIENTE	CONSENSO FROM CUSTOMER/PLC	Ø	63	63	2.5mm²
INGRESSO DA PRESSOSTATO	INPUT TO PRESSURE SWITCH	Ø	64	64	ECO12-NET
INGRESSO DA PRESSOSTATO	INPUT TO PRESSURE SWITCH	Ø	67	67	ECO12-NET
DELTA/P FILTER MEASURE 4-20mA	MISURA DELTA/P FILTRO 4-20mA	Ø	68	68	ECO12-NET
DELTA/P FILTER MEASURE 4-20mA	SCHERMO MISURA DELTA/P FILTRO 4-20mA	SCHERMO	SCH	—	
SHIELD/DELTA/P FILTER MEASURE 4-20mA	SELETTORE INREMOTO	Ø	70	70	2.5mm²
SELETTORE INREMOTO	SELETTORE INREMOTO	Ø	71	71	SA1
REMOTE SELECTOR	REMOTE SELECTOR	Ø	—	—	4mm²

Project: Q.E. GESTIONE ECO12-NET E 6 ELETTROVALVOLE
E.B. MANAGEMENT ECO12-NET AND 6 ELECTROVALVES

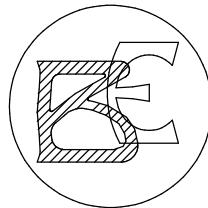
Customer: BALLESTRA

Job order: 994/39

Reference: Fq 81032 - Job 1E35Z

Note:

Power Supply:	110Vac
Power Anticondensation Resistance:	/
Power Solenoid Valve:	24Vac
Drw n°:	ITEM 65F1



BOLDROCCHI
ECOLOGIA

BOLDROCCHI s.r.l.

V.LE TRENTO E TRIESTE N°93 - 20046 BIASSONO (MI) ITALY

Tel. 0039-(0)39 22021 Fax 0039-(0)39 2753498

e-mail: boldrocchi@boldrocchi.eu

Rev.	Modifications	Date	Prepared	Verified	Approved of

BOLDROCCHI DIV. ECOLOGIA - VIALE TRENTO E TRIESTE 93 - 20046 BIASSONO - MILANO (ITALY)

DESMET BALLESTRA

JOB 1E35

CONSUMER LIST

						JOB N°	DRAWING N°	REVISION
						FQ81032	OO-E1-01	0
0	14/04/10	First emission	AnSe	AnSe	Ro,Ra	 BOLDROCCHI ECOLOGIA	COVER	
REV.	DATE	DESCRIPTION	ISSUED	CONTROLLED	APPROVED			

SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)			[4] -						
	[FC] Frequency Converter	[SS] Soft Starter	[2] -			[5] -						
	[SD] Star/Delta	[TD] TD= Two direction	[3] -			[6] -						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	64F1	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2																	
3																	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)			[4] -						
	[FC] Frequency Converter	[SS] Soft Starter	[2] -			[5] -						
	[SD] Star/Delta	[TD] TD= Two direction	[3] -			[6] -						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	64F2	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2																	
3																	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE				FEEDING FROM							
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)	[4] -								
	[FC] Frequency Converter	[SS] Soft Starter	[2] -	[5] -								
	[SD] Star/Delta	[TD] TD= Two direction	[3] -	[6] -								

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	62F1	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	62K1	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	62F2	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	62K2	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	62F4	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	62K4	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	62F5	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	62K5	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F2	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K2	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F9	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K4	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	64F3	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	64K5	I.D. Fan motor		400	3	50	5,5		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F6	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K6	I.D. Fan motor		400	3	50	3		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)			[4] -						
	[FC] Frequency Converter	[SS] Soft Starter	[2] -			[5] -						
	[SD] Star/Delta	[TD] TD= Two direction	[3] -			[6] -						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE	
		EQ	M	N														
1	1	QL	PF	65F7	Cleaning control panel		110	1	50	0,150			[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K7	I.D. Fan motor		400	3	50	3			[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F8	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K9	I.D. Fan motor		400	3	50	3		[1]	[D]	ABB		BOLDROCCHI	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)	[4] -								
	[FC] Frequency Converter	[SS] Soft Starter	[2] -	[5] -								
	[SD] Star/Delta	[TD] TD= Two direction	[3] -	[6] -								

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F11	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K8	I.D. Fan motor		400	3	50	3		[1]	[D]	ABB		BOLDROCCHI	
3																	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)			[4] -						
	[FC] Frequency Converter	[SS] Soft Starter	[2] -			[5] -						
	[SD] Star/Delta	[TD] TD= Two direction	[3] -			[6] -						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	62F3	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	62K3	I.D. Fan motor		400	3	50	3		[1]	[D]	ABB		BOLDROCCHI	
3																	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE				FEEDING FROM						
	[D] Direct	[F] Feeder	[1] Low Voltage Panel (CLIENT)	[4] -							
	[FC] Frequency Converter	[SS] Soft Starter	[2] -	[5] -							
	[SD] Star/Delta	[TD] TD= Two direction	[3] -	[6] -							

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F1	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2																	
3																	
4																	
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SYMBOLS LEGEND	FEEDING AND START-UP TYPE						FEEDING FROM					
	[D] Direct	[F] Feeder	[1]	Low Voltage Panel (CLIENT)	[4]	-						
	[FC] Frequency Converter	[SS] Soft Starter	[2]	-	[5]	-						
	[SD] Star/Delta	[TD] TD= Two direction	[3]	-	[6]	-						

POS.	REV.	TAG NUMBER			DESCRIPTION		VOLTAGE [V]	PHASE N°	FREQUENC Y [Hz]	NOMINAL POWER [kW]	NOMINAL CURRENT [A]	FEEDING FROM (SEE LEGEND)	FEEDING AND START-UP TYPE (SEE LEGEND)	BRAND	MODEL	SUPPLIED	NOTE
		EQ	M	N													
1	1	QL	PF	65F10	Cleaning control panel		110	1	50	0,150		[1]	[F]	AUTEL	-	BOLDROCCHI	
2	1	M	FN	65K5	I.D. Fan motor		400	3	50	3		[1]	[D]	ABB		BOLDROCCHI	
3																	
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A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		T	TRASFORMATORE TRANSFORMER		RT	TERMICA THERMAL		HL	LED LED	B
C		QF	INTERRUTTORE AUTOMATICO MAGNETOTERMICO DIFFERENZIALE DIFFERENTIAL MAGNETO-THERMAL AUTOMATIC SWITCH		RT	CONTATTI TERMICA THERMAL CONTACTS		HL	SEGNALAZIONE QUADRO IN TENSIONE ELECTRIC PANEL VOLTAGE SIGNALING	C
D		QF	INTERRUTTORE AUTOMATICO DIFFERENZIALE DIFFERENTIAL AUTOMATIC SWITCH		KM	CONTATTORI CONTACTORS		SBE	PULSANTE DI EMERGENZA NORMALMENTE CHIUSO EMERGENCY PUSH BUTTON NORMALLY CLOSED	D
E		QS	SEZIONATORE SECTIONALISING SWITCH		KM	CONTATTI DI POTENZA CONTATTORI CONTACTOR POWER CONTACTS		SB	PULSANTE STABILE NORMALMENTE CHIUSO STABLE PUSH BUTTON NORMALLY CLOSED	E
F		QS	SEZIONATORE CON FUSIBILI SECTIONALISING SWITCH WITH FUSES		KM	CONTATTI AUSILIARI CONTATTORI CONTACTOR AUXILIARIES CONTACTS		SB	PULSANTE STABILE NORMALMENTE APERTO STABLE PUSH BUTTON NORMALLY OPENED	F
G		QS	INTERRUTTORE-SEZIONATORE AUTOMATICO AUTOMATIC SECTIONALISING SWITCH		KA	RELÉ RELAY		SA	SELETTORE DUE POSIZIONI (0-1) TWO POSITION SELECTOR (0-1)	G
H		F	PORTAFUSIBILE NON SEZIONABILE NOT SECTIONABLE FUSE-CARRIER		KA	CONTATTI RELÉ RELAY CONTACTS		SA	SELETTORE A CHIAVE DUE POSIZIONI (0-1) TWO POSITION SELECTOR KEY (0-1)	H
I		F	PORTAFUSIBILE SEZIONABILE SECTIONABLE FUSE-CARRIER		KT	TEMPORIZZATORE TIMER		SA	SELETTORE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR (1-0-2)	I
J		F	PORTAFUSIBILE SEZIONABILE + NEUTRO SECTIONABLE FUSE-CARRIER + NEUTRAL		KT	CONTATTI TEMPORIZZATORE TIMER CONTACTS		SA	SELETTORE A CHIAVE TRE POSIZIONI (1-0-2) THREE POSITION SELECTOR KEY (1-0-2)	J
		Q	MAGNETOTERMICO MAGNETO-THERMAL		HL	LAMPADA LAMPEGGIANTE FLASHING LAMP		HA	SIRENA SIRENE	
		Q	CONTATTI MAGNETOTERMICO MAGNETO-THERMAL CONTACTS		HL	LAMPADA LAMP		HA	SUONERIA BUZZER	

A	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	SIMBOLO SYMBOL	SIGLA SIGN	DESCRIZIONE DESCRIPTION	A
B		SQ	FINECORSÀ LIMIT SWITCH		P	AMPEROMETRO AMMETER		G	ALIMENTATORE FEEDER	B
C		BF	FOTOCELLULA A RIFLESSIONE PHOTOCELL TO REFLECTION		P	VOLTMETRO VOLTMETER		YV	ELETROVALVOLA MONOSTABILE MONOSTABLE SOLENOID VALVE	C
D		SQ	SENSORE MAGNETICO MAGNETIC SENSOR		R	RESISTENZA RESISTANCE		YV	ELETROVALVOLA BISTABILE BISTABLE SOLENOID VALVE	D
E		SQ	SENSORE DI PROSSIMITÀ PROXIMITY SENSOR		R	POTENZIOMETRO POTENTIOMETER		V	VENTOLA PER RAFFREDDAMENTO Q.E. E.B. COOLING FAN	E
F		SP	PRESSOSTATO PRESSURE SWITCH		R	GRUPPO RC RC GROUP		M	MOTORE MONOFASE MONO-PHASE MOTOR	F
G		ST	TERMOSTATO THERMOSTAT		R	VARISTORE VARISTOR		M	MOTORE TRIFASE THREE-PHASE MOTOR	G
H		S	GALLEGGIANTE FLOATING		L	INDUTTANZA INDUCTANCE		M	MOTORE STELLA/TRIANGolo S/T MOTOR	H
I		P	OROLOGIO CLOCK		XS	PRESA INTAKE		U	FRENO BRAKE	I
J		P	CONTATTI OROLOGIO CLOCK CONTACTS		XS	PRESA INDUSTRIALE 1P+N+T INDUSTRIAL INTAKE 1P+N+T		X	MORSETTO TERMINAL	J
		C	CONTATTORE DI IMPULSI IMPULSES COUNT		XS	PRESA INDUSTRIALE 2P+N+T INDUSTRIAL INTAKE 2P+N+T		PE	BARRA DI TERRA EARTH BAR	
	TA		TRASFORMATORE AMPEROMETRICO AMMETER TRANSFORMER		E	NEON NEON		PE	TERRA EARTH	

A

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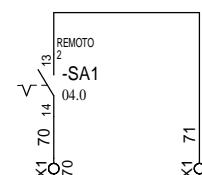
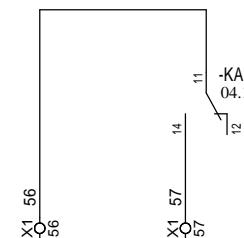
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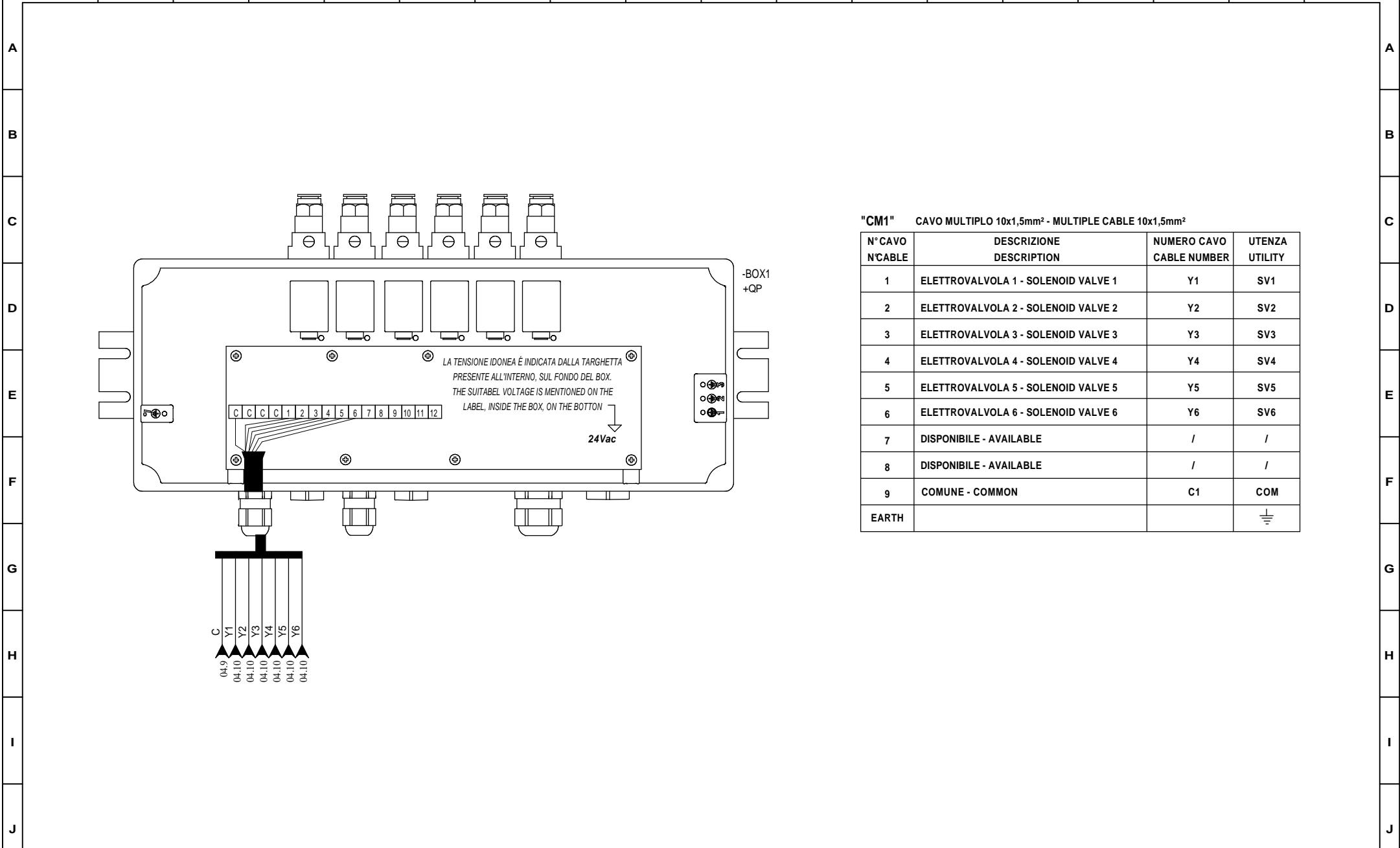
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**"CM1"** CAVO MULTIPLO 10x1,5mm² - MULTIPLE CABLE 10x1,5mm²

N°CAVO N'CABLE	DESCRIZIONE DESCRIPTION	NUMERO CAVO CABLE NUMBER	UTENZA UTILITY
1	ELETROVALVOLA 1 - SOLENOID VALVE 1	Y1	SV1
2	ELETROVALVOLA 2 - SOLENOID VALVE 2	Y2	SV2
3	ELETROVALVOLA 3 - SOLENOID VALVE 3	Y3	SV3
4	ELETROVALVOLA 4 - SOLENOID VALVE 4	Y4	SV4
5	ELETROVALVOLA 5 - SOLENOID VALVE 5	Y5	SV5
6	ELETROVALVOLA 6 - SOLENOID VALVE 6	Y6	SV6
7	DISPONIBILE - AVAILABLE	/	/
8	DISPONIBILE - AVAILABLE	/	/
9	COMUNE - COMMON	C1	COM
EARTH			—



BOLDKORCHI ECOLOGIA

V.LE TRENTO E TRIESTE N°93
20046 BIASSONO (MI) ITALY
Tel. 0039-(0)39 22021 Fax 0039-(0)39 2753498

x1

DESCRIZIONE DESTINAZIONE	
ALIMENTAZIONE 110vac	POWER SUPPLY 110vac
ALIMENTAZIONE 110vac.	POWER SUPPLY 110vac
ALIMENTAZIONE 110vac	POWER SUPPLY 110vac
ALIMENTAZIONE 110vac	POWER SUPPLY 110vac
SEGNALE D'ALARME	ALARM SIGNAL
SEGNALE D'ALARME	ALARM SIGNAL
CICLO DI PULIZIA ON	CLEANING CYCLE RUNNING
CICLO DI PULIZIA ON	CLEANING CYCLE RUNNING
PRESenza TENSIONE	VOLTAGE PRESENCE
CONSENSO DA PLC CLIENTE	CONSENSO DA PLC CLIENTE
CONSENSO DA PLC CLIENTE	CONSENSO DA PLC CLIENTE
CONSENSI FROM CUSTOMERS PLC	CONSENSI FROM CUSTOMERS PLC
INGRESSO DA PRESSOSTATO	INPUT TO PRESSURE SWITCH
INGRESSO DA PRESSOSTATO	INPUT TO PRESSURE SWITCH
INGRESSO DA PRESSOSTATO	INPUT TO PRESSURE SWITCH
MISURA DELTA P FILTRO 0-20mA	MISURA DELTA P FILTRO 0-20mA
MISURA DELTA P FILTRO 0-20mA	MISURA DELTA P FILTRO 0-20mA
MISURA DELTA P FILTRO 0-20mA	MISURA DELTA P FILTRO 0-20mA
MISURA DELTA P FILTRO 0-20mA	MISURA DELTA P FILTRO 0-20mA
SCHERMO MISURA DELTA P FILTRO 0-20mA	SCHERMO MISURA DELTA P FILTRO 0-20mA
SHIELD DELTA P FILTER MEASURE 4-20mA	SHIELD DELTA P FILTER MEASURE 4-20mA
SELETTORE IN REMOTO	SELETTORE IN REMOTO
REMOTE SELECTOR	REMOTE SELECTOR
SELETTORE IN REMOTO	SELETTORE IN REMOTO
SELETTORE IN REMOTO	SELETTORE IN REMOTO
FARTH-FOR AUXILIARIES	FARTH-FOR AUXILIARIES

DESTIN	FILO	MORSETTO	SEZIONE	ORIGIN
	Ø	—	Ø	4mm ²
	Ø	18	Ø	2.5mm ²
	Ø	19	Ø	2.5mm ²
	Ø	50	Ø	2.5mm ²
	Ø	51	Ø	2.5mm ²
	Ø	54	Ø	2.5mm ²
	Ø	55	Ø	2.5mm ²
	Ø	56	Ø	2.5mm ²
	Ø	57	Ø	2.5mm ²
	Ø	60	Ø	2.5mm ²
	Ø	61	Ø	2.5mm ²
	Ø	63	Ø	2.5mm ²
	Ø	64	Ø	2.5mm ²
	Ø	67	Ø	2.5mm ²
	Ø	68	Ø	2.5mm ²
-	SCHERMO	SCH	Ø	2.5mm ²
	Ø	70	Ø	2.5mm ²
	Ø	71	Ø	2.5mm ²
	Ø	—	—	4mm ²

CUSTOMER:

BALLESTRA

ITEM 65F1

PROJECT: 994-39-R10

JOB ORDER: 994/39

DATE: 03/09/2010

REF: Eq 81032 - Job 1E357

BRE

TEM 65F1

SUBJECT: Q.E. GESTIONE ECO12-NET E 6 ELETTROVALVOLE
E.B. MANAGEMENT ECO12-NET AND 6 ELECTROVALVES

TITLE: AIR INTAKE ELECTRIC BOARDS WIRING DIAGRAM & LAYOUT

SHEET 07
OF 07

06 < >