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SM-TURRETS

CONTROL UNIT DDC1-12-H**/22
CONTROL UNIT DDC1-30/12-H**/20

Software: **SFW062G002, SFW062G003, SFW062G006, SFW062G012, SFW062I238 SFW062I239, SFW062I229, SFW062I245, SFW062I003**

INSTALLATION MANUAL

INSTRUCTIONS FOR ELECTRICAL CONNECTIONS OF INTEGRATED CONTROL UNIT

Correspondence between electronic unit code and software

Electronic unit	Code	Software	Turret	Notes
DDC1-30/12-K20/22	0496053K20	SFW062F002 SFW062G002 SFW062I002	SMA-*-25/2*-*-230	Std. 8/12 positions
DDC1-30/12-K**/22	0496053K**	SFW062I244	SMA-*-25/2*-*-230	8/12 positions high inertia
DDC1-30/12-K20/22	0496053K20	SFW062G012 SFW062I012	SMA-*-25/2*-*-230	6 and 12 positions
DDC1-30/12-K**/22	0496053K**	SFW062I239	SMA-*-25/2*-*-230	12 and 24 positions
DDC1-12-H20/22	0496006H20	SFW062G003	SMA-*-20/2*-*-230	Std. 8/12 positions
DDC1-12-H20/20	0496006H20	SFW062I003	SMA-*-20/2*-*-230	8 and 12 positions (Compatible with SFW062E003)
DDC1-12-H20/22	0496006H20	SFW062I003	SMA-*-20/2*-*-230	8 and 12 positions (Compatible with SFW062E003)
DDC1-12-H20/22	0496006H20	SFW062G006 SFW062I006	SMA-*-20/2*-*-230	6 and 12 positions
DDC1-12-H**/22	0496006H**	SFW062I238	SMA-*-20/2*-*-230	12 and 24 positions
DDC1-12-H16/22	0496006H16	SFW062G003	SMA-*-16/2*-*-230	Std. 8/12 positions
DDC1-12-H16/22	0496006H16	SFW062I003	SMA-*-16/2*-*-230	8 and 12 positions (Compatible with SFW062E003)
DDC1-12-H16/20	0496006H16	SFW062I003	SMA-*-16/2*-*-230	8 and 12 positions (Compatible with SFW062E003)
DDC1-12-H16/22	0496006H16	SFW062G006 SFW062I006	SMA-*-16/2*-*-230	6 and 12 positions
DDC1-12-H**/22	0496006H**	SFW062I245	SMA-*-16/2*-*-230	8 and 16 positions

Notes: Software release ‘E’,’F’, and ‘G’ will be replaced by software release ‘I’.

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The information described in this manual may be subject to variations due to technical modifications.
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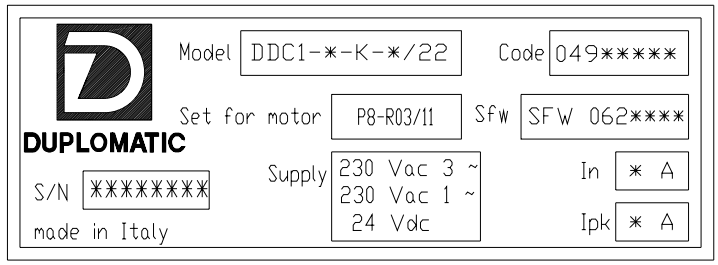
1. GENERAL INFORMATION

The Duplomatic control unit is a compact system that controls all functions regarding positioning and driving of the **SM* turrets Duplomatic**. The interfacing to the lathe is powerful and simplified for an easy installation**.**
Serial line RS232 is set for diagnostic and remote control by PC.

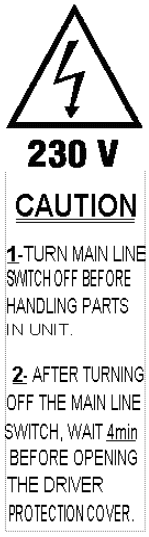
CODE OF THE CONTROL UNIT

It is possible to see all the data concerning the control unit looking at this stamp, applied on its rack.



Correspondence:
Model: **DDC1-12-K20/ 22**
Software version: **SFW062I003** for SM-20

IMPORTANT NOTE FOR SAFETY



Do not manipulate the inside of the unit
Only personnel authorized by Duplomatic may manipulate the inside of this unit.

Do not manipulate the connectors with the unit connected to AC power.
Before manipulating the connectors (inputs/outputs, feedback, etc.) make sure that the unit is not connected to AC power.

The control unit, even after the power off of the supply, stores internally electric power until the power capacitors are charged.
Be careful when operate on it.

EMC COMPLIANCE

The turret has been tested under the condition reported as follows and obtained the compliance for: CEI EN 61800-3 and CEI EN 61800-4.

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CHARACTERISTICS OF THE CONTROL UNIT TYPE DDC1-30/12-K**/22
CHARACTERISTICS OF THE CONTROL UNIT TYPE DDC1-12-H**/20

- Best path research.
- External selection of rotation direction.
- Automatic reference search.
- Parity control on position code.
- Enhanced diagnostic.
- Selection of two ranges of positions (eg. 8 and 12 or 6 and 12) with dedicated inputs.
- Selection of inertia on disc with dedicated input.
- Speed reduction for maintenance purposes with dedicated input. (not for software I003)
- 'Safety' behaviour can be set by CNC or PC.

The entire unit is insulated from the external with optoinsulators to satisfy safety standards.
Parameters of the system are optimised and cannot be modified by the customer.

TECHNICAL CARACTERISTICS OF THE CONTROL UNIT

Power supply	
Power input **3 Φ**	230V +10% - 10 % 50/60Hz ±2Hz 3 Φ 12A max.
Auxiliary input **2 Φ**	230V±10% 50/60Hz ±2Hz 2 Φ 35VA

tab 1

Supply for I/O	
Digital inputs • Type • Voltage • Current	optoinsulated Sink 24 VDC ±10% 5 mA @ 24 VDC
Digital outputs • Type • Voltage • Max current for signals Electrovalve • Type • Voltage Max current for electrovalve	Optoinsulated • Transistor NPN (Source) • 24 VDC ±10% • 0.2A @ 24 VDC Optoinsulated • Transistor NPN (Source) • 24 VDC ±10% • 0.5A @ 24 VDC

tab 2

General specifications	
Operative Temperature	0 ÷ 55 °C
Humidity	30.. 95%
Vibrations	4G RMS (for short period) 0,5 RMS (continuously)

tab 3

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2. ELECTRICAL CONNECTIONS

Refer to the annex diagrams:
1. **: wiring diagram for standard turrets.**
2. **: cables**
3. **: timings**
4. **: instructions for RS-232 serial cable**

SUPPLY

POWER SUPPLY 230 VAC 3 Φ

(see tab1)
The control unit requires a three-phase 230 VAC input for the power card.
A power contactor on the 230 AC line must be used for emergency stop (see wiring diagram).
The 230 VAC line must be protected with external fuses 10 A T.(or 4-6.3 A motor start)
An inrush current can happen at power-on due to the internal 300uF power capacitors.
An external filter is required to meet E.M.C. compliance (optional).

POWER SUPPLY 230 VAC 2 Φ

(see tab1)
The control unit requires a single-phase 230 VAC input for the logic card.
A 500mA T **F2** fuse must be used to protect this supply.

POWER SUPPLY 24VDC FOR I/O

(see tab 2)
On the control unit are present two different connections +24VDC.

The **+24VDC** on terminal **P10-2** is used to supply the electrovalve and must be protected with a 500 mA T fuse **(F5)**.
The **+24VDC** on terminal **P10-6** is used to supply the signals outputs and must be protected with a 500mA FF fuse **(F4).**

0VDC is connected at terminal **P10-24**.

Note: during turret start-up, use P10-1 and P10-7 connections for 24V DC. In this way the fuses inside the connection box are used and can protect the unit against mistakes on wirings. After the positive test switch to P10-2 and P10-6 and use the fuses in the cabinet that are more reachable.

TECHNICAL SPECIFICATIONS FOR POWER TRANSFORMER DESIGN

Rated primary voltage	Variable
Secondary rated voltage	230 VCA ± 10% 3 Φ
Rated Power	1000 VA
Max voltage drop at 20 A rms (during acceleration)	5%
Connection	star-star or delta-star
Secondary voltage deviation	± 2%

tab 4

Important: check the voltage drop on the 230 VAC supply during acceleration, to be sure that this doesn't approach the indicated voltage limits.

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I/O SIGNALS

OUTPUTS TO CNC

LOCKED: turret locked.
INDEXD: turret in position (can be used to start axis movement).
ALBIT1, **ALBIT2**, **ALBIT4:** alarms code.

OUTPUTS TO ELECTROVALVE

EVLOCK: locking valve.
EVULCK: unlocking valve.

INPUTS FROM CNC

PBIT01, **PBIT02**, **PBIT04**, **PBIT08, (PBIT16):** position code bits.
PARITY: parity for position codes.
PSTART: signal for starting turret cycle.
PTAB01, **PTAB02:** set 8/12 positions.
PTAB03: set low/high inertia.
MODE01, **MODE02**, **MODE03:** mode selection code bits.
SPDSEL: selection of standard or maintenance speed. (not for software SFW062I003)

SELECTION OF THE NUMBER OF POSITIONS

The turret can be easily configured for two different number of positions simply setting two signals in the control unit. No mechanical operations or part replacement are required

Software	8/12 tools		6/12		12/24		8/16	
Tools N°	8	12	6	12	12	24	8	16
PTAB01	24VDC	0VDC	24VDC	0VDC	24VDC	0VDC	24VDC	0VDC
PTAB02	0VDC	24VDC	0VDC	24VDC	0VDC	24VDC	0VDC	24VDC

The 24VDC for selections must be done at the same time with 230 VAC 1 Φ (max lag time 500 ms).
If the 24 VDC is done with a lag time over 500 ms, the turret can not start and **ALARM 78 (or 77)** appears.

SELECTION OF LOW/HIGH INERTIA

The turret can be easily configured to drive two ranges of inertia just setting a signal in the control unit.
No mechanical operations or part replacement are required

	Standard inertia	**High inertia**
PTAB03	connected to 24VDC	not connected

SELECTION OF STANDARD/MAINTENANCE SPEED

This input can be used to slow-down immediately the turret in front of dangerous operations (door opening, maintenance operations). The speed is about the 20% of the nominal speed.
Connect the SPDSEL input to the 24VDC supply if not used.

	Standard speed	**Maintenance speed**
SPDSEL	connected to 24VDC	not connected

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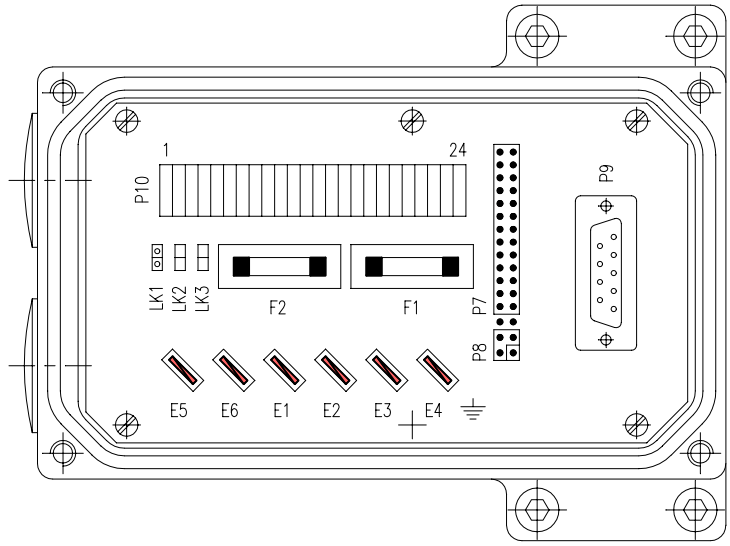
CONNECTION BOX AND TERMINALS LAY-OUT



Name	Terminal	Name	Terminal
CM2-FUSE-F2	P10-1	MODE03	P10-21
CM2	P10-2	SPAREINP1	P10-22
EVLOCK	P10-3	SPDSEL	P10-23
EVULCK	P10-4	COM 0V	P10-24
SPAREOUT1	P10-5		
		PTABO1	LK1
CM1	P10-6	PTABO2	LK2
CM1-FUSE-F1	P10-7	PTABO3	LK3
LOCKED	P10-8		
INDEXD	P10-9	R	E1
ALBIT1	P10-10	S	E2
ALBIT2	P10-11	T	E3
ALBIT4	P10-12	PE	E4
PBIT01	P10-13	L	E5
PBIT02	P10-14	N	E6
PBIT04	P10-15		
PBIT08	P10-16	P9-2	RS232-RXD
PARITY	P10-17	P9-3	RS232-TXD
PSTART	P10-18	P9-4	RS232-DTR
MODE01	P10-19	P9-5	RS23-2SG
MODE02	P10-20	P9-7	RS232-RTS

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3. INTERFACING TO CNC

OPERATING FUNCTIONS

The control unit offers several operating functions (also called MODES).
Setting MODE01, MODE02, and MODE03 signals can make the selection of the operating functions.

N°	OPERATING FUNCTIONS	INPUTS			DESCRIPTION
		MODE01	MODE02	MODE03	
0	**Emergency/ Reset**	0	0	0	Setting this mode will stop immediately the turret. Alarms can be reset setting this mode and the setting another mode.
1	**Automatic shortest path**	1	0	0	The turret will use the shortest path to reach the position required.
2	**Automatic CW**	0	1	0	The turret will always use the CW direction path to reach the position required.
3	**Automatic CCW**	1	1	0	The turret will always use the CCW direction path to reach the position required.
4	**Jog, next tool in CW or CCW**	0	0	1	The turret will reach the next position.
5	**Service**	1	0	1	Enables a series of functionality to simplify the start-up phase and troubleshooting
6	**Maintenance (only by PC)**	-	-	-	
7	**Safety**	1	1	1	Enables a series of functionality to overcome conditions that normally would stop the turret for a long time.

ZERO SEARCH

After any power-on of the control unit (230 V -1 phase auxiliary supply) the turret must execute the reference cycle.

At the end of the reference cycle the turret is locked in position 1.
To execute the reference cycle proceed as follows

1. Set an automatic function (1,2 or 3)
2. Set this code.

POSITION	PARITY	PBIT01	PBITO2	PBIT04	PBIT08	(PBIT16)
Zero cycle	0	0	0	0	0	0

3. Set impulsive **PSTART** to reach out the zero position
   (**PSTART** must stay on for more than 30 ms).
4. Wait 500 ms after INDEXD and LOCKED signals give the end of the cycle.

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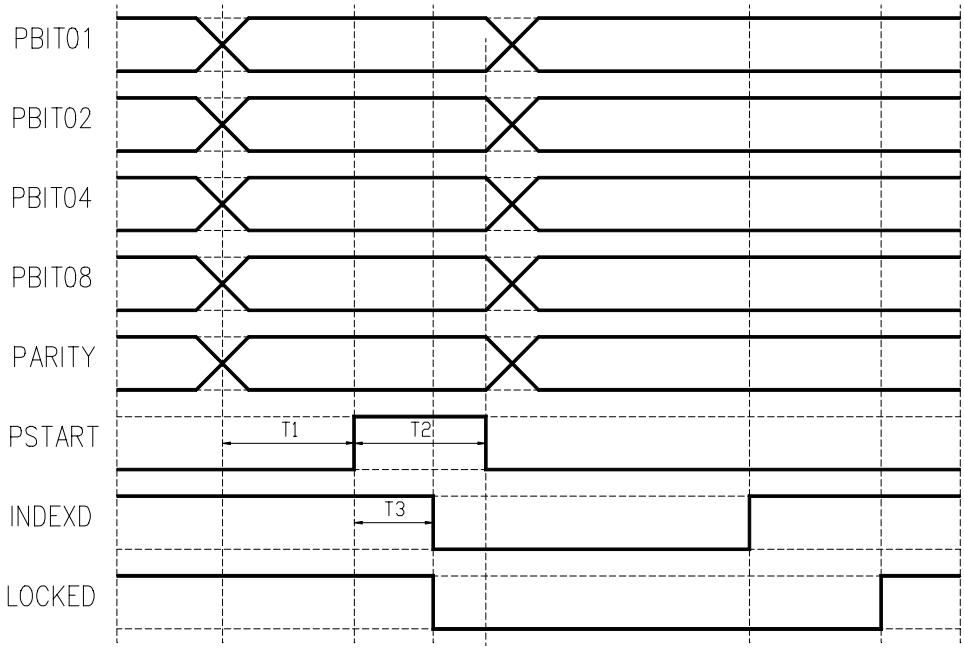
OPERATING FUNCTIONS DESCRIPTION



AUTOMATIC OPERATING FUNCTIONS (1,2,3)

- Set the code of the position required.
- Wait until the position code output is stable (it depends on what type of PLC/CNC outputs are used - relay, static…).
- Give the PSTART command (active on its rising front). PSTART must stay ON for more than 30 ms (T2).
- The turret confirms the reception of the start signal by setting low both INDEXD and LOCKED signal after approximately 30 ms (T3).
- When the position requested has been reached, but the disc is not yet locked, the INDEXD signal is set high (this signal can be used to start the approach of the tool to the part to be worked on).
- After the disc has been locked, the LOCKED signal is set to high. The turret can work.
- Position bits and parity bit must be stable for at least 30 ms. from PSTART signal. After this time and once the turret confirmed the start reception, position bits, parity bit, and start signal can be changed until the INDEXED signal is low. **However it is strongly recommended to keep position bits and parity code set to the last position called.**
- The PSTART signal can be reset after the confirmation of the reception, typically it must stay on for at least 30 ms (T2).

Important: the end of cycle must be detected by the LOCKED signal that changes from low to high and with the INDEXD signal high and no alarms are present.

SAME TOOL CALL

In case of the turret is already in the position called (for example change in tool offset T1.01 ..T1.02) the turret will not move or unlock/lock but the INDEXD and LOCKED signals will have the same behaviour as a normal rotation (INDEX and LOCKED low after the PSTAR and then after approx. 200ms the INDEX goes HIGH and after 50 ms more the LOCKED signal goes HIGH).

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INDEXD SIGNAL

The INDEXD signal must be used with the LOCKED signal to detect the end of cycle of the turret and can be ignored once the turret is locked.
The INDEXD output goes and stay LOW also when the emergency mode is set and if the three-phase power supply is OFF.
In this case, if the turret management from PLC/CNC uses the emergency mode or open the power contactor, the INDEXD signal must be used only when the turret is in cycle and then ignored.
The CNC/PLC program must check the LOCKED signal while the turret is not in cycle: if this signal goes LOW stop immediately the machine and check the cause.

JOG MODE

The turret does not output the position code, so in JOG mode the actual position must be memorised by the CNC / PLC.
Be sure to not show in the screen of CNC a tool position different from the reality.
We suggest to use always the automatic mode in order to force CNC to keep track of the turret position.

ALARM CONDITIONS

When an alarm condition is detected, one or more of the ALBIT1, ALBIT2, ALBIT4 is high and the INDEXD signal is low.
In this case the machine must be immediately stopped and the three-phase power contactor should be opened.
Important: the turret can show alarms in any time (also if it is not on cycle) so **check always the alarm output of the turret.**

EXCESSIVE ELECTRICAL NOISE OR BAD WIRING DETECTION

If the turret is not in cycle and in automatic mode, any variation in POSITION BITS and PARITY must be followed by the PSTART signal.
If the PSTART does not came in about 5 seconds (T1) an alarm 7 (73) is output from the turret.
Avoid to change the position code just after the turret LOCKED signal goes high (end of cycle) because this can be detected as a new position request.
See the diagnostic section to have more details.

AUTOMATIC RECOVER FOR PRESSURE/VALVES PROBLEMS

The turret will attempt three times to lock or unlock before giving an alarm (41 or 51).
If the operator hear the valve operated more timed during the tool change it is necessary to check the cause of the problem and remove it before a permanent failure happens.

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OPERATING FUNCTION N°0: EMERGENCY / RESET

OPERATING FUNCTION N°0	INPUTS		
	MODE01	MODE02	MODE03
Emergency/reset	0	0	0

This operating function has two purposes:
1) Stop all turret movement (**EMERGENCY**).
2) Acknowledge all alarms, if they are present (**RESET**).
It must stay on for more than **30 ms** to be read by the control unit. It isn't necessary to carry out a RESET to go into or out operating function. In any case**, if a RESET is executed, it is necessary to wait 800 ms before any variation of signals.**
The INDEX signal goes low after a RESET.
The alarm output will be cleared changing from operating function N°0 to another operating function (e.g. Automatic).

OPERATING FUNCTION N°1,2,3: AUTOMATIC

These operating functions are normally used to drive the turret.
Just set the code of the position required, give the start signal and the turret will automatically reach the position.

1. Clear all alarms (if present);
2. Set an automatic function:

OPERATING FUNCTION N°1,2,3	INPUTS		
	MODE01	MODE02	MODE03
Automatic with shortest path search	1	0	0
Automatic CW	0	1	0
Automatic CCW	1	1	0

3. Set the position code: (use PBIT16 only for turrets with 16 tools or more).

	POSITION												
CODE	Zero Cycle	1	2	3	4	5	6	7	8	9	10	11	12
PBIT01	0	1	0	1	0	1	0	1	0	1	0	1	0
PBIT02	0	0	1	1	0	0	1	1	0	0	1	1	0
PBIT04	0	0	0	0	1	1	1	1	0	0	0	0	1
PBIT08	0	0	0	0	0	0	0	0	1	1	1	1	1
(PBIT16)	0	0	0	0	0	0	0	0	0	0	0	0	0
PARITY	0	1	1	0	1	0	0	1	1	0	0	1	0

	POSITION												
CODE		13	14	15	16	17	18	19	20	21	22	23	24
PBIT01		1	0	1	0	1	0	1	0	1	0	1	0
PBIT02		0	1	1	0	0	1	1	0	0	1	1	0
PBIT04		1	1	1	0	0	0	0	1	1	1	1	0
PBIT08		1	1	1	0	0	0	0	0	0	0	0	1
(PBIT16)		0	0	0	1	1	1	1	1	1	1	1	1
PARITY		1	1	0	1	0	0	1	0	1	1	0	0

4. Set **PSTART** for give the confirmation of the movement within 5 s.
   (It must stay ON for more than 30 ms).

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OPERATING FUNCTION N°4: JOG

The disc will rotate of one step in the selected direction.
Proceed as follows

1. Clear all alarms (if present);
2. Set the operating function:

OPERATING FUNCTION N°4:	INPUTS		
	MODE01	MODE02	MODE03
Next station in CW or CCW	0	0	1

3. Select direction:

	PBIT01	PBIT02
Rotation in CW	1	0
Rotation in CCW	0	1

4. Set **PSTART** for give the confirmation of the movement in 5 s.
   (It must stay ON for more than 30 ms).

OPERATING FUNCTION N°5: SERVICE

The turret cycle can be executed “step by step”: unlocking, rotation, locking.
Proceed as follows

1. Clear all alarms (if present);
2. Set an operating function:

OPERATING FUNCTION N°5:	INPUTS		
	MODE01	MODE02	MODE03
Service	1	0	1

3. Select a command:

	PBIT01	PBIT02	PBIT04	PBIT08	PARITY
Locking	0	0	1	0	0
Unlocking	0	0	0	1	0
Next tool CW	1	0	0	0	1
Next tool CCW	0	1	0	0	1
Continuos rotation CW	1	0	0	0	0
Continuos rotation CCW	0	1	0	0	0

4. Set **PSTART** for give the confirmation of the movement within 5 s.
   (It must stay ON for more than 30 ms).
   Locking and unlocking don’t require **PSTART** signal.

OPERATING FUNCTION N°6: MAINTENANCE

Can be used to test the functionality of the control unit with RS232 and a special software for Windows on a PC (SERVICE DUPLOMATIC).

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OPERATING FUNCTION N °7: SAFETY

The standard behaviour of the turret can be changed in order to allow the turret to work even if there are problems mainly on proximity switches.

WARNING: all the functions are intended to be used only in case of effective problems. The improper use can cause a damage of the turret or the machine.

Proceed as follows:
1. Clear all alarms (if present);
2. Set the operating function:

OPERATING FUNCTION N°7:	INPUTS		
	MODE01	MODE02	MODE03
SAFETY	1	1	1

3. Select the operation:

n°		PBIT01	PBIT02	PBIT04	PBIT08	PARITY
1	**Execute the reference cycle (1)**	1	0	0	0	1
2	**Disable the management of unlocking switch: (the unlocking phase is based upon time instead that switch output) (2)**	0	1	0	0	1
3	**Disable the management of locking switch: (the locking phase is based upon time instead that switch output) (2)**	1	1	0	0	0
4	**Assume the actual position of the disc as position number 1 and disable the management of reference switch (3)**	0	0	1	0	1
5	**Apply a speed reduction of 30%**	1	0	1	0	0
6	**Disable the management of the thermal detector of the motor (4) (only SW rel 'I')**	0	1	1	0	0
7	**Toggle ON/OFF the output of the second digit of the last alarm. (5) (only SW rel 'I')**	1	1	1	0	1
8	**Toggle ON/OFF the serialize mode (6) (only SW rel 'I')**	0	0	0	1	1
9	**Toggle ON/OFF the output of the status of the switches (7) (only SW rel 'I')**	1	0	0	1	0
10	**Enable the autotest function (8) (only SW rel 'I')**	0	1	0	1	0
15	**Reset to standard functionality**	1	1	1	1	0

4. Set the PSTART signal two times (with a pause of about 50ms. between the two pulses) without changing the code pattern to activate the function required.

IMPORTANT: there is no confirmation about the correct execution of the operation, because this is intended as a manual operation with effect that can be easily verified by operator.

All functionality set by this mode will be automatically reset at the power-off of the control unit.

(1) This is an alternative way to execute the reference cycle in CNC in which the tool T 0 is not allowed. In this case only one PSTART is required.
(2) In this case we assume that the turret is surely locked or unlocked in about 400 ms.
(3) Be sure that the disc is really in position 1, elsewere this operation could be dangerous. This function can be performed only if the reference cycle has not yet been executed.
(4) Please be sure that thermal detector is broken otherwise this could damage the servomotor.
(5) The second digit of the alarm code is output on the ALBIT1..ALBIT4. A reset will turn-off this function.

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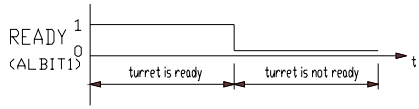
(6) In this case a slow SSI - like protocol (Serial Synchronous Interface) is enabled using the ALBITs outputs.

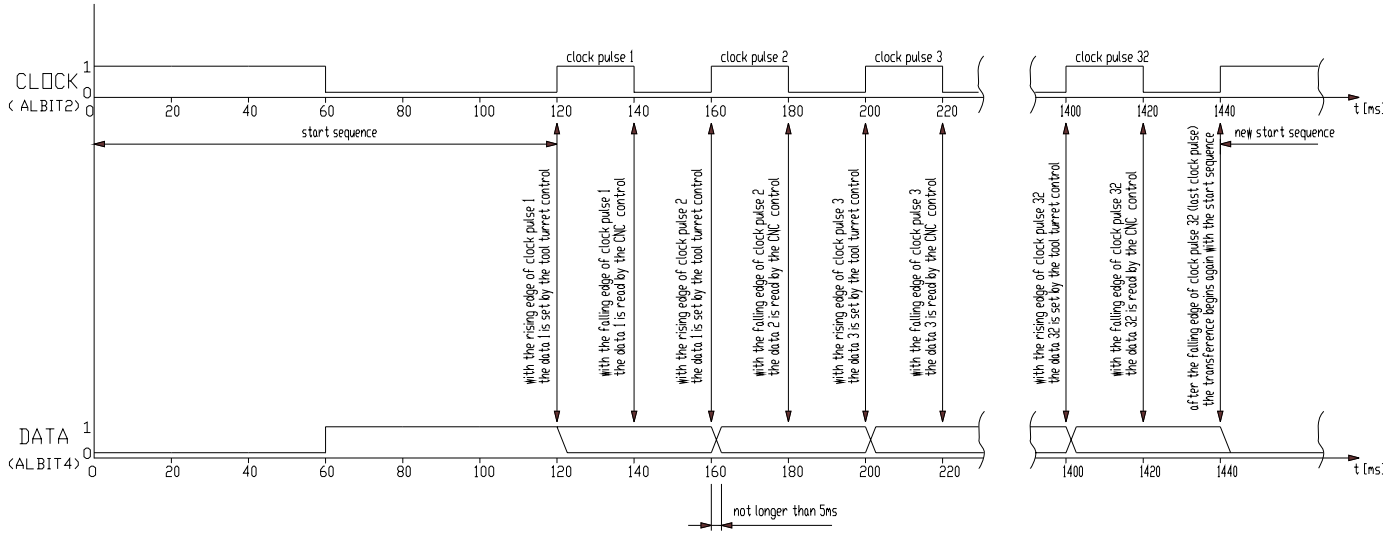
SIGNAL	READY	CLOCK	DATA
OUTPUT	ALBIT1	ALBIT2	ALBIT4

The READY signal is independent an is ON if the turret is OK.
If the turret is in alarm or in emergency, READY is OFF.



IMPORTANT

The READY signal is completely independent from all the other signals and is changing immediately from 1 to 0 after any kind of turret fault



The data transmitted are: (MSB fist, LSB last) in order:

Byte 1: FULL ALARM CODE (HEX eg. Alarm 35 -> 0011 0101)

Byte 2: Turret Position (0-> turret out of position; <>0 turret is/can be locked on the position)

Byte 3: Digital inputs 1:

In order (ZEROSW,ULCKSW,LOCKSW, MOTVL,PTAB03,MOD03,MOD02,MOD01)

Byte 4: Digital inputs 2:

In order (PTAB02,PTAB01,PSTART,PARITY,PBIT08,PBIT04,PBIT02,PBIT01)

(7) The status of the switches of the turret is output as follows:

SIGNAL	MOTOVL (thermal detector)	ZEROSW (reference)	LOCKSW (locking)	ULCKSW (unlocking)
OUTPUT	INDEXD	ALBIT1	ALBIT2	ALBIT4

A reset will disable this function.

(8) Danger of collision to other parts of the lathe! Move the turret in a safe zone befor starting the cycle. The autotest function is stopped and disabled by putting the turret in emergency mode (MODE 0).()

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4. DIAGNOSTIC

ALARMS AND WARNINGS

The electronic unit constantly executes self-diagnosis and can signal alarms condition.
Alarm code is provided on output ALBIT1, ALBIT2, ALBIT4 according to the following table.

ALARM CODE			ALARM N°	DESCRIPTION
ALBIT1	ALBIT2	ALBIT4		
1	0	0	1	Fault of supply.
0	1	0	2	Over voltage.
1	1	0	3	Over current/servo error/ thermal detector.
0	0	1	4	Unlocking faults, (switch fault, setting, pressure supply fault, etc.).
1	0	1	5	Locking faults, (switch fault, setting, pressure supply fault, etc.).
0	1	1	6	Zero search fault, (switch fault, setting, etc.).
1	1	1	7	Zero search missed/ Position code error/ Cycle time out/ PSTART signal time out.

Alarm are stored and can be reset with EMERGENCY/RESET function.
Power off causes the reset of the active alarm.
A better identification of the alarm codes is possible by a PC with RS232 interface and a Duplomatic diagnostic software. available
Please refer to the EXTENDED ALARM DESCRIPTION to get a more complete description of the alarm and to have information about troubleshooting.

The serial communication parameters are: 9600,N,8,1

Fault of electronic unit:
After recognizing the fault, the problem can be easily solved.
In case of electronic unit fault, it can be easily replaced.

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EXTENDED ALARM DESCRIPTION/TROUBLESHOOTING

ALARM CODE	Description
10	Fault in internal supply: check the 230 V auxiliary supply.
11	Drop on the Three-Phase voltage during tool change. Check the Three-Phase voltage. (only SW rel I)
20	Overvoltage: - Check all external three-phase supplies.
21	Overvoltage reached during dynamic braking: -the inertia loaded on disc is too high: check that the configuration signal (PTAB03 -LK3 on connection board) is set to the proper inertia range. -Check that the Three-Phase voltage is not over specs.
30	Motor Overload (mean current too high): -the indexing frequency is too high.
31	Overcurrent (current limit reached): -inertia loaded on disc exceeds limits (check that the turret is set to the right inertia value by the PTAB03 signal – LK3 on connection box); -the unbalanced load exceeds limits; -crash during disc rotation; -zero switch or zero cam are not well positioned (if the alarm happen when the turret is locking at the reference cycle completion; -wiring to the motor or the resolver is defective.
32	Following error: -inertia loaded on disc exceeds limits (check that the turret is set to the right inertia value by the PTAB03 signal – LK3 on connection box); -the unbalanced load exceeds limits; -the tool touch the piece slowly during disc rotation; -the wiring to the resolver is defective.
33	The time limit to execute the cycle has been reached: -the tool touch the piece slowly at the end of the cycle so cannot reach the final position;
35	The thermal detector of the motor : -indexing frequency too high; -defective motor; -the thermal detector is not connected.
36	The reference cam is not in the expected position. (only SW rel I)
40	The signal of the locking switch stays on during the unlocking phase: -unlocking pressure too low; -bad position of locking switch; -bad switch connection/wiring (remote application mainly); -the locking switch is defective.
41	The signal of the unlocking switch stays off during the unlocking phase: -unlocking pressure too low; -bad position of locking switch; -bad switch connection/wiring (remote application mainly); -the locking switch is defective.
42	The signal of the unlocking switch goes off while the turret is unlocked: -problems of pressure; -bad switch connection/wiring (remote application mainly); -the unlocking switch is defective.
43	The signal of the locking switch goes on while the turret is unlocked: -problems of pressure; -bad switch connection/wiring (remote application mainly); -the locking switch is defective.
44	The turret is unlocked at power-on: -the electrovalve is defective or positioned in such a way that the internal part can move without command (vertical);
45	The two pressure inlet or the LOCKED and UNLOCKED switches are reversed. (only SW rel I)

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ALARM CODE	Description
50	The signal of the unlocking switch stays on during the locking phase: -locking pressure too low (only hydraulic); -bad position of unlocking switch; -bad switch connection/wiring (remote application mainly); -the unlocking switch is defective.
51	The signal of the locking switch stays off during the locking phase: -locking pressure too low (only hydraulic); -bad position of locking switch; -bad switch connection/wiring (remote application mainly); -wrong control unit code (card for a different size); -wrong reference cam regulation (turret lock over teeth); -the locking switch is defective.
52	The signal of the locking switch goes off while the turret is locked: -problems of pressure (only hydraulic); -bad switch connection/wiring (remote application mainly); -the locking switch is defective.
53	The signal of the unlocking switch goes on while the turret is locked: -problems of pressure (only hydraulic); -bad switch connection/wiring (remote application mainly); -the unlocking switch is defective.
55	The two pressure inlet or the LOCKED and UNLOCKED switches are reversed. (only SW rel I)
61	Time-out in fine reference search: -the zero switch is defective (always off); -bad switch connection/wiring (remote application mainly); -the disc cannot rotate.
70	A tool is called before executing the zero cycle: -error in programming logic of CNC; -the operator did not call the reference cycle.
71	Parity Error in position code: -error in programming logic of CNC; -problems on wiring (PBIT** and PARITY) -slow outputs of CNC/PLC (the output value van be incorrect when the PSTART signal is given)
72	A tool non existing has been called: -error in CNC programming; -turret not correctly configured (check the number of positions set by PTAB01 and PTAB02 signals - LK1 and LK2 in connection box); -wiring problems.
73	A variation in position code has been detected but the PSTART signal is not arrived in within 2 seconds: -error in CNC programming; -wiring problems (PSTART signal not connected).
74	The time limit of continuos rotation of disc has been reached: -the turret has been activate in maintenance mode or service for long time; -the indexing frequency is too high.
78 or 77	The configuration input signals PTAB01 and PTAB02 are not configured (number of positions): -error in PTAB01 and PTAB02 setting (LK1 and LK2 in connection box); -the 24 V DC supply is delayed for more than 500 ms in respect of the 230 V AC auxiliary supply (the configuration has not been loaded correctly).

Note: the code number is memorised by the control unit and can be read with a Duplomatic diagnostic software installed on a PC with the RS232 interface.

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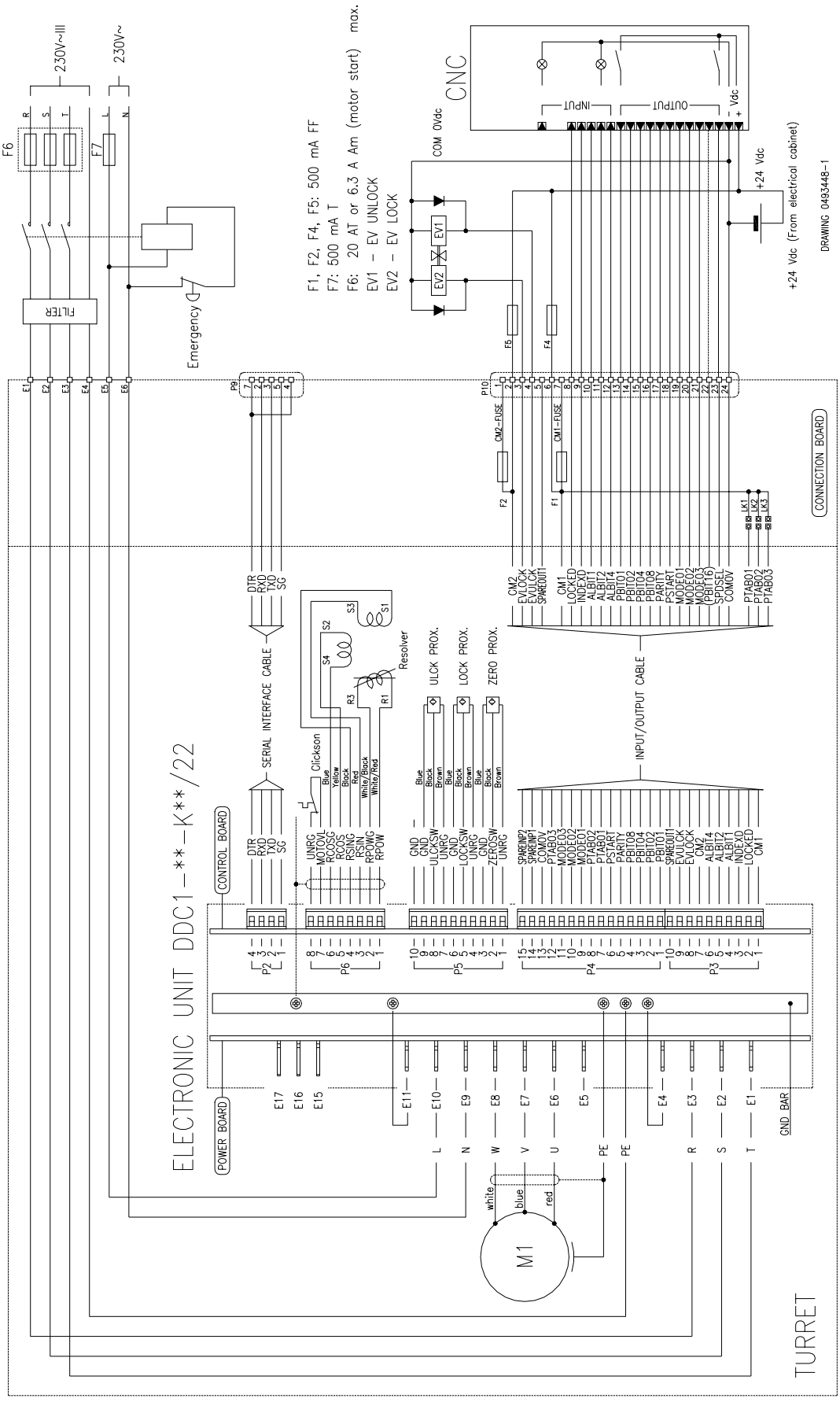

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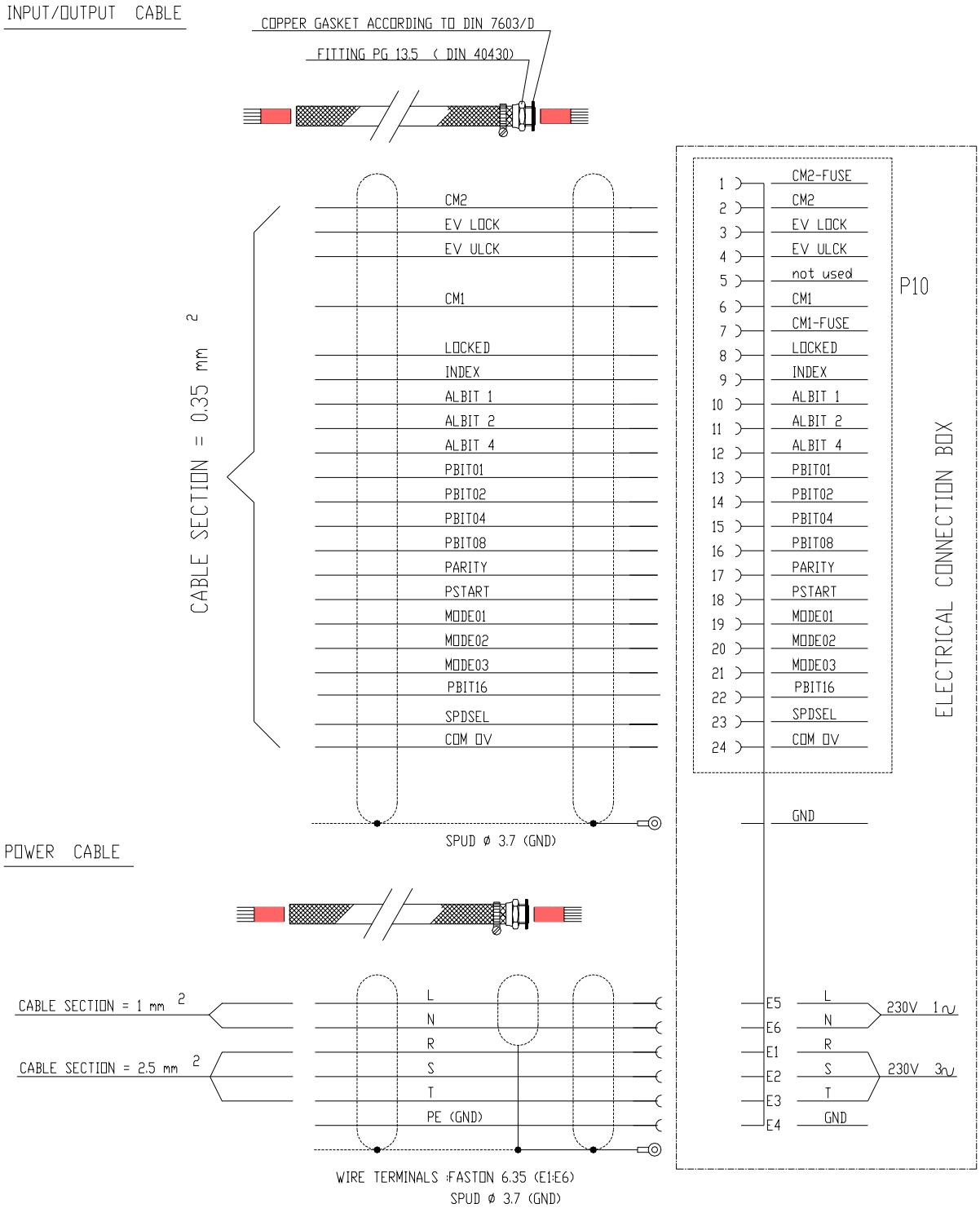

NB. -On CM1 and CM2 connections there are F1 and F2 protection fuses (see wiring diagram sheet 8)
-For first connection and start-up please use P10/7 and P10/1 pins,and than,
after positive test, shift the connections on P10/6 and P10/2 pins

drawing 98025-3

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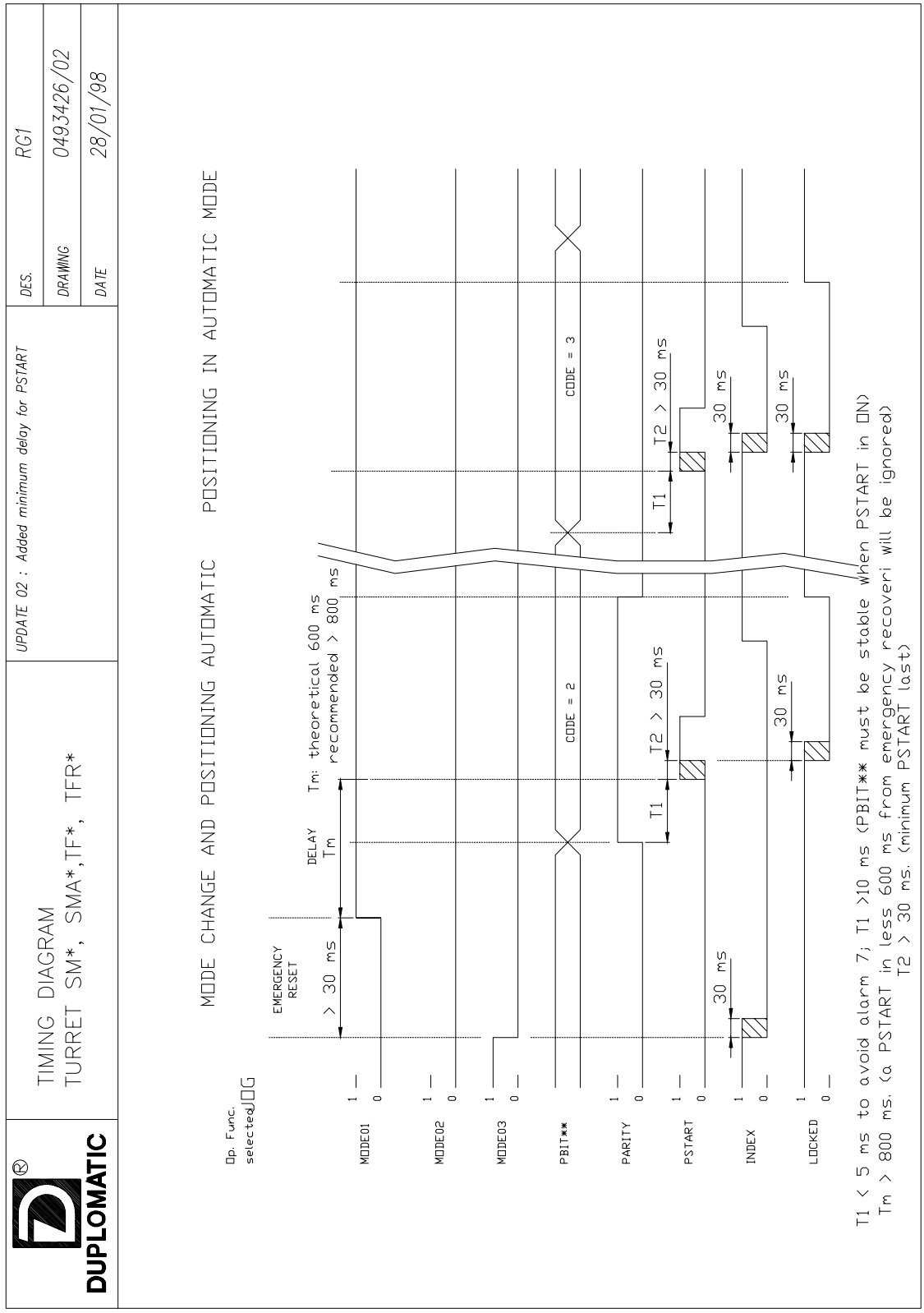

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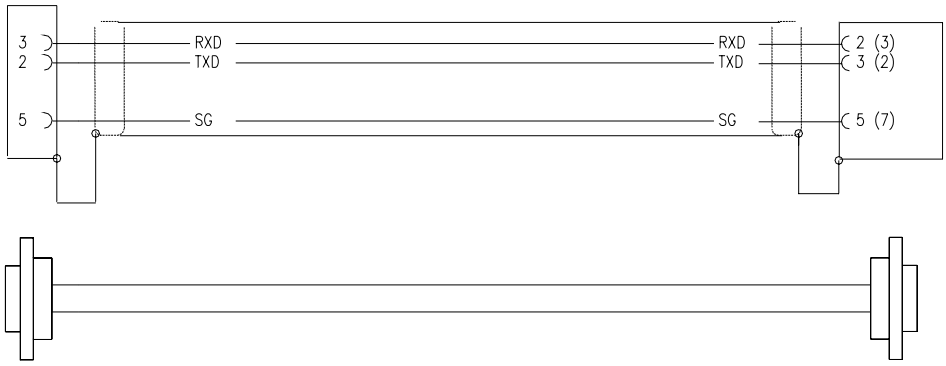
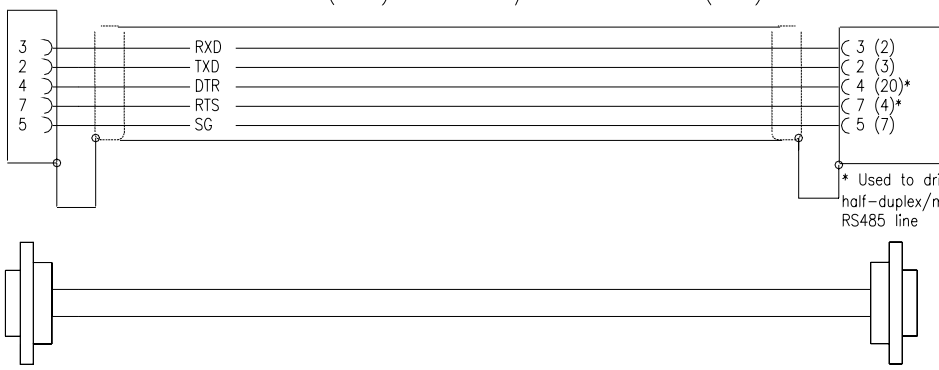
CABLE DDC* (DCE) – PC (DCE)



DDC* side
Shell connector
type SUB-D 9 pins female

PC side
Shell connector
type SUB-D 9 (25) pins female

CABLE DDC* (DCE) – RS485/422 ADAPTER (DTE)

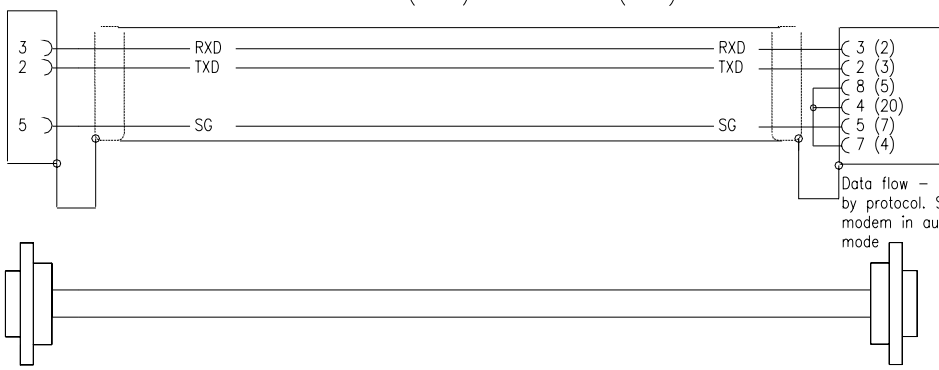


* Used to drive
half-duplex/multi-drop
RS485 line

DDC* side
Shell connector
type SUB-D 9 pins female

Adapter side
Shell connector
type SUB-D 9 (25) pins male

CABLE DDC* (DCE) – MODEM (DTE)



Data flow – controlled
by protocol. Set the
modem in auto-answer
mode

DDC* side
Shell connector
type SUB-D 9 pins female

PC side
Shell connector
type SUB-D 9 (25) pins male

Revisione 01 :	DUPLOMATIC	Connection cable RS 232 for control unit DDC*	Date : 12-03-98
Revisione 02 :			disegn. : RG1
Revisione 03 : Added cables for modem and RS422/485 adapters (PG)			0493429/03

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DUPLOMATIC AUTOMAZIONE S.p.A.
20025 LEGNANO (MI) - ITALY

P.LE BOZZI, 1
TEL.+(86) 0512-55177726
FAX.+(86)0512-55177725

DUPLOMATIC
AUTOMAZIONE

e-mail: **hS-889@163.com**

Come and visit Duplomatic homepage:
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