SUMMARY

1. INTRODUCTION

The DMBL drives supports two different serial protocols:
1) TDEMACNO proprietary communication protocol
2) MODBUS RTU communication protocol

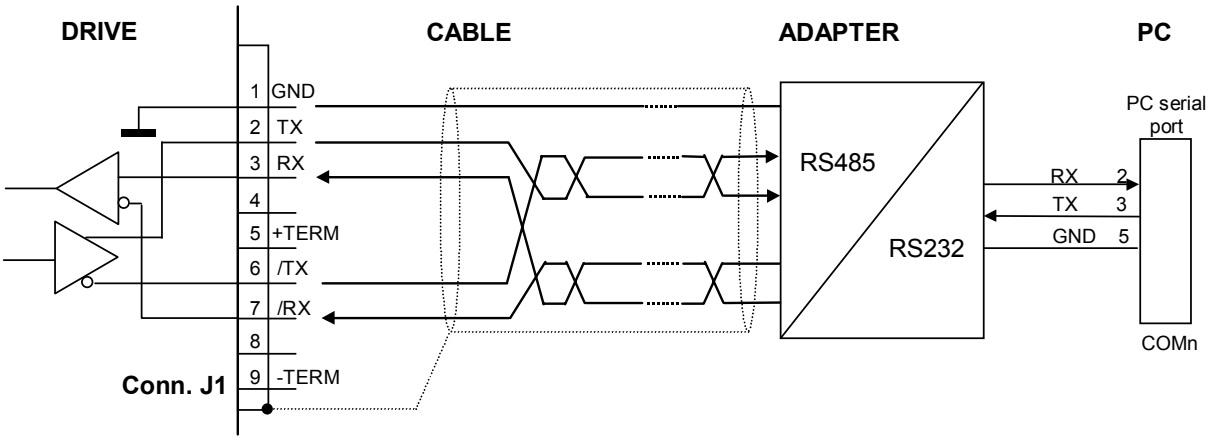
It is possible to select one of these two protocols by setting **c57**:

c57 = 0	TDEMACNO
c57 = 1	MODBUS RTU

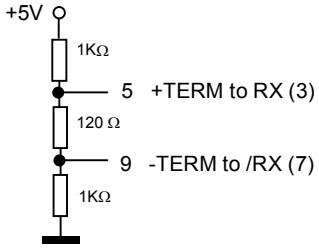
In the following sections these two protocol are explained: users that want to realize his own supervision system can find the parameter tables, the addresses, the functions and the byte frames to communicate through serial line between the drive and a Master device (PC, PLC, terminal,...).

TDE MACNO supplies on request a "serial package" composed of demo supervision software and RS232/RS485 adapter with cable.

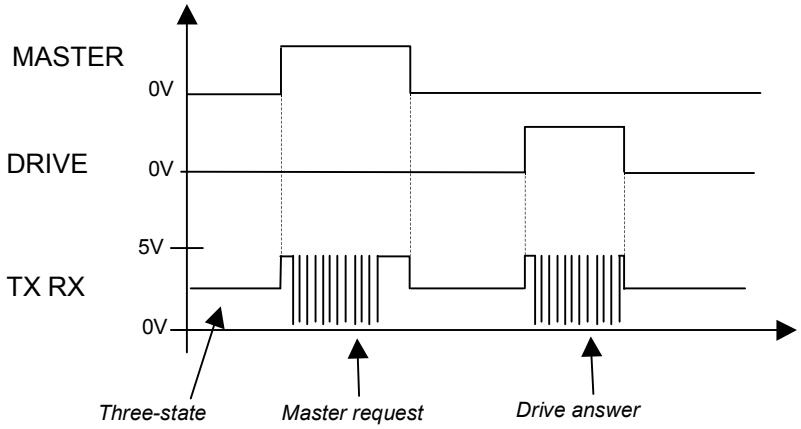
2. SERIAL LINE CONNECTION (J1 CONNECTOR)



The serial line communicates in half duplex with four wires: RX+ and RX- are receiving wires for the drive while TX+ and TX- are the transmission wires. Connection can be made with only two wires connecting RX+ and TX+ and RX- and TX- on J1 connector.
The common mode voltage between adapter and drive must not exceed –7V +12V (RS485 standard).
Inside the converter are provided impedance to 'terminate' (120Ω) and to polarise the line, like in the figure. To use this termination connect 5 with 3 and 9 with 7.



The communication wires must be twisted and shielded. The shield can be connected to the metal of the connector, because this part is connected to earth.
The transmission line is normally left in three-state. When the Master sends its request, it must enable the adapter line drivers (type 75176) and hold the line. After the transmission the line must be released, to allow the drive answer:



3. TABLES OF PARAMETERS AND DISPLAYS

3.1. TYPES OF PARAMETERS

	Type	Description	Read/Write
P	Parameters	Numerical values	R/W
c	Connections	Logic switches with 2 or more contacts. They are used to select among more possibilities.	R/W
d	Displays	Internal drive values (voltage, current, speed,…)	R
A	Alarms	Diagnostics of the drive	R
i	Inputs	State of logic inputs and of logic functions	R
o	Outputs	State of logic outputs and of logic functions	R

3.2. MEANING OF THE TABLE FIELDS

Column **"PAR"** contains the parameter number as it is displayed on the keypad.
Column **"DESCRIPTION"** contains a brief description of the parameter.
Column **"RANGE**" contains maximum and minimum limits, and the units of the parameter.
Column **"addr"** contains Modbus address.
Column **"BS"** contains a letter or a number to explain how parameter values are stored inside the converter:

- A letter means that the internal value is a number "x" in percent of a base scale number.

from internal value to percent value	from percent value to internal value
percent value = 100 * x / base scale	x = percent value * base scale /100

base scale table

letter	description
A	Base scale = 16383
B	Base scale = 4095

- A number means that the internal value is a number "x" scaled by a power of 10 :

from internal value to real value	from real value to internal value
real value = $x/10^n$	x = real value * 10^n

conversion ratio table, where x = internal number

number	description
0	n = 0 par=x
1	n = 1 par=x/10
2	n = 2 par=x/100

Column **"Note"** contains the informations about the writing protections of parameters:
- n = parameter value can be changed only if drive is off-line
- r = parameter value can be changed only if the customer code number is set in **P50**
- t = parameter value can be changed only if the TDE MACNO code number is set in **P80**

Parameter **P99** contains the customer code number (**P50**). On demand this code can be customized.

WARNING: The default customer code number is P50 = 95

3.3. PARAMETERS

PAR	DESCRIPTION	RANGE	addr	BS	NOTE
P01	JOG 1 speed	±100.0%	100	A	
P02	JOG 2 speed	±100.0%	101	A	
P03	JOG 3 speed	±100.0%	102	A	
P04	Analog speed reference offset, 1/100000 parts of speed reference	±19999	103	0	
P05	Max CW speed limit	0÷105.0%	104	A	
P06	Max CCW speed limit	0÷105.0%	105	A	
P07	Position for curve 1 (encoder pulses)	±19999	106	0	
P08	Position for curve 2 (encoder pulses)	±19999	107	0	
P09	Offset (encoder pulses) with respect to resolver zero	±19999	108	0	
P10	Gain for positioning (kv)	0÷100	109	0	
P11	CW acceleration time	50÷19999 ms	10A	0	
P12	CW deceleration time	50÷19999 ms	10B	0	
P13	CCW acceleration time	50÷19999 ms	10C	0	
P14	CCW deceleration time	50÷19999 ms	10D	0	
P15	Displ. for curve 1 with external sensor (encoder pulses)	±19999	10E	0	
P16	Displ. for curve 2 with external sensor (encoder pulses)	±19999	10F	0	
P17	Position for curve 1 (in turns number)	±19999	110	0	
P18	Position for curve 2 (in turns number)	±19999	111	0	
P19	Time for emergency switch off ramp	0÷2000 ms	0	0	
P20	Level for enabling P23, P24	0÷200.0 %	113	B	
P21	Speed loop proportional gain when |speed|+|REF| < P20	0.5÷100.0	114	1	
P22	Speed loop lead time constant when |speed|+|REF| < P20	4.0÷150.0 ms	115	1	
P23	Speed loop proportional gain |speed|+|REF|≥P20	0.5-100.0	116	1	
P24	Speed loop lead time constant when |speed|+|REF|≥P20	4.0-150.0 ms	117	1	
P25	Speed loop filter constant time	0.4÷20 ms	118	1	
P26			119		
P27	Starting value of speed regulator integral	±100.0%	11A	B	n
P28			11B		
P29			11C		
P30	Time for the inertia compensation	0÷19999	11D	0	
P31	Torque signal offset (T.REF)	±100.0%	11E	B	
P32	Torque signal correction coefficient (T.REF)	±400.0%	11F	B	
P33	Current limit signal offset (I.LIM)	±100.0%	120	B	
P34	Limit signal correction coefficient (I.LIM)	±400.0%	121	B	
P35	Max CW current limit	0÷100.0%	122	B	
P36	Max CCW current limit	0÷100.0%	123	B	
P37			124		
P38			125		
P39			126		
P40			127		
P41	Minimum speed level	0÷100.0%	128	B	
P42	Maximum allowed speed level	0÷120.0%	129	B	
P43	Lower speed value for speed relay	±100.0%	12A	B	n
P44	Upper speed value for speed relay	±100.0%	12B	B	n
P45	Lower current value for current relay	±100.0%	12C	B	n
P46	Upper current value for current relay	±100.0%	12D	B	n
P47			12E		
P48			12F		
P49	Sample time (scope function)	1÷1000 ms	130	0	
P50	Customer code number for reserved parameters (r)	0÷9999	131	0	n
P51	Drive identification number for the serial line	1÷255	132	0	r
P52	Maximum motor speed (rpm)	375÷19000	133	0	r
P53	Number of motor poles	2÷12	134	0	r
P54	Number of resolver poles	2÷12	135	0	r
P55	Resolver phase	±180.0°	136	1	r
P56	Motor rated current in % of drive rated current	10.0%÷100.0%	137	B	r
P57	Motor thermal time constant	1.0÷600.0 sec.	138	1	r
P58	Motor inductance in mH x motor rated current / motor voltage	0.0-100.0%	139	B	r
P59	Ti=Lff/Rff	1-100 ms	13A	0	r
P60	External voltage reference corresponding to the maximum motor speed	2500÷10000 mV	13B	0	r

PAR	DESCRIPTION	RANGE	addr	BS	Notes
P61	Encoder frequency reference coefficient	0÷16383	13C	0	
P62	Vnmot/Vnaz	0.0%-100.0%	13D	B	r
P63	Kq1 e Kd1 correction coefficient	0.0%-400.0%	13E	B	r
P64			13F		
P65			140		
P66			141		
P67			142		
P68			143		
P69			144		
P70			145		
P71	Enc. pulse ratio numerator	19999	146	0	
P72	Enc. pulse ratio denominator	19999	147	0	
P73			148		
P74			149		
P75	o22 advance (enc. pulses)	0÷19999	14A	0	r
P76	o23 advance (enc. pulses)	0÷19999	14B	0	r
P77	Final speed for curve 1	1.0%÷100.0%	14C	A	
P78	Final speed for curve 2	1.0%÷100.0%	14D	A	
P79	Serial line Baud Rate	0÷2	14E	0	
P80	code number for TDEMACNO reserved parameter (t)	0÷9999	14F	0	n
P81	Analogue ref. correction coefficient	50.0%÷199.0%	150	A	t
P82	Current correction coefficient	100.0%÷200.0%	151	B	t
P83	Drive rated current in % of the current limit	20.0%÷100.0%	152	B	t
P84	Drive limit reenter time constant	1.0÷10 sec.	153	1	t
P85	DC bus voltage measurement coeff.	50.0%÷200.0%	154	B	t
P86	DC bus minimum voltage	60.0%÷130.0%	155	B	t
P87	DC bus maximum voltage (% P92)	50.0%-120.0%	156	B	t
P88			157		
P89			158		
P90			159		
P91			15A		
P92	Clamping Voltage (% DC BUS rated voltage)	65.0%÷150.0%	15B	B	t
P93			15C		
P94	Choice 0=Vel/ 1=Corr	0-1	15D	0	t
P95	Torque current (P64=1)	0.0%-100.0%	15E	B	t
P96			15F		
P97			160		
P98			161		
P99	Customer code number for reserved parameters (r)	0÷9999	162	0	t

3.4. CONNECTIONS

CON.	DESCRIPTION	RANGE	addr	Notes
c01	Logic input 1 meaning	1÷21	200	r
c02	Logic input 2 meaning	0	201	r
c03	Logic input 3 meaning	1÷21	202	r
c04	Logic input 4 meaning	1÷21	203	r
c05	Logic input 5 meaning	1÷21	204	r
c06	Logic input 6 meaning	1÷21	205	r
c07	Logic output 1 meaning	0÷16	206	r
c08	Logic output 2 meaning	0÷16	207	r
c09	External speed ref. Inversion	0 not inverted 1 inverted	208	r
c10	Simulated encoder channel B inversion	0 not inverted 1 inverted	209	r
c11	Choice pulse/rev. Resolver for simulated encoder	0÷7	20A	r
c12	Choice of zero simulated encoder phase	0÷3	20B	r
c13	A.P.O. 1 meaning	0÷19	20C	
c14	Choice external reference	0 (analog) 1 (freq. 2 channels) 2 (freq. and up / down)	20D	r
c15	Meaning logic input 7	1÷21	20E	r
c16	Meaning logic input 8	1÷21	20F	r
c17	Meaning A.P.O. 2	0÷19	210	r
c18	Meaning logic output 3	0÷16	211	r

CON.	DESCRIPTION	RANGE	addr	Notes
c19	Excl. alarms A3-A4-A5-A7-A9	0÷31	212	r
c20	Integral excl. in the speed regulator	0 not excluded 1 excluded	213	n
c21	Run command	0 stop 1 run	214	
c22	Parallel bit to REF1	0 OFF 1 ON	215	
c23	Parallel bit to REF2		216	
c24	Parallel bit to LS1	0 open 1 closed	217	
c25	Parallel bit to LS2		218	
c26	Ramp inclusion	0 excluded 1 included	219	
c27	Stop with or without min. speed	0 disabled 1 enabled	21A	
c28	Stop on limit switches with or without ramp	0 without 1 with	21B	
c29	Software drive consent	0 alarm 1 no alarm	21C	
c30	Reset alarms	0→1 reset	21D	
c31	External current limit enable	0 disabled 1 enabled	21E	
c32	Enable torque input	0 disabled 1 enabled	21F	
c33	relative or absolute speed data	0 relative 1 absolute	220	
c34	Motor thermal devices causes drive block	0 no block 1 block	221	
c35	Position / Speed	0 Speed 1 Positioner	222	r
c36	Start Pos.1	0→1 start	223	
c37	Start Pos.2	0→1 start	224	
c38	Zero search direction	0 CCW, LS2 1 CW, LS1	225	n
c39	Incremental/absolute positioning	0 incremental 1 Absolute	226	
c40	SW Zero search command	0→1 start	227	
c41	Reset to default values	0→1 reset to default	228	n
c42	Reset to EEPROM values	0→1 reset to eeprom	229	n
c43	save RAM into EEPROM	0→1 save	22A	n
c44	Resolver phase auto-tuning command	0→1 start	22B	r
c45	Current regulator auto-tuning command	0→1 start	22C	r
c46			22D	
c47			22E	
c48			22F	
c49			230	
c50			231	
c51	Value displayed in run state	1÷19	232	
c52	Sensor	0→1 active	233	
c53	Mains supply failure managing switch	0÷2	234	r
c54	Double speed positioning	0÷2	235	n
c55	Zero search starting mode	0÷1	236	n
c56	Zero search mode	0÷2	237	n
c57	Serial protocol	0 TDEMACNO 1 MODBUS	238	n

3.5. DISPLAYS

	DESCRIPTION	RANGE	BS	addr
d00	Sofware version		2	300
d01	External speed reference %	±100.0%	A	301
d02	Speed ref. before the ramp %	±100.0%	A	302
d03	Speed ref. after the ramp %	±100.0%	A	303
d04	Speed feedback %	±100.0%	B	304
d05	Motor speed in r.p.m. %	0÷19000	0	305
d06	Integral part of the speed regulator %	±100.0%	B	306
d07	Value of the external torque signal %	±100.0%	B	307
d08	External current limit %	0÷100.0%	B	308
d09	Current limit CW %	0÷100.0%	B	309
d10	Current limit CCW %	0÷(-100.0)%	B	30A
d11	Actual current %	±100.0%	B	30B
d12	DC BUS Voltage (V)	0÷999	0	30C
d13	Actual position (encoder pulse)		0	30D
d14	Resolver position (encoder pulse)	± ½ revolution (c11 e.p.)	0	30E
d15	Torque current Iq	±100.0%	B	30F
d16	Direct current Id	±100.0%	B	310
d17	Torque voltage Vq	±100.0%	B	311
d18	Direct voltage Vd	±100.0%	B	312
d19	Motor voltage Vm	0÷100.0%	B	313
d20	Actual position (High word)		0	314
d21	Actual position expressed by ratio P71/P72		0	315

3.5.1. ALARMS WORD

address = 500H

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
A16	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1

Bit description:

	DESCRIPTION	STATE (H=0N L=OFF)
A2	RAM, EEPROM alarm	L-H
A3	Power failure	L-H
A4	Radiator thermal switch	L-H
A5	Motor thermal switch	L-H
A6	Motor thermal protection	L-H
A7	Resolver failure	L-H
A8	External alarm	L-H
A9	Overspeed	L-H
A10	DC bus minimum voltage	L-H
A11	DC bus overvoltage	L-H
A12	Inputs configuration error	L-H
A13	Pole setting error	L-H
A14	Motor connections error	L-H
A15	Mains supply failure	L-H

3.5.2. DIGITAL INPUT OUTPUT

	DESCRIPTION	STATE (H=ON L=OFF)	addr
i1	Logic input LI1 state	L-H	30
i2	Logic input LI2 state	L-H	31
i3	Logic input LI3 state	L-H	32
i4	Logic input LI4 state	L-H	33
i5	Logic input LI5 state	L-H	34
i6	Logic input LI6 state	L-H	35
i7	Logic input LI7 state	L-H	36
i8	Logic input LI8 state	L-H	37
i9	On-line signal state	L-H	38
i10	Torque enable signal state	L-H	39
i11	External enable signal state	L-H	3a
i12	Ref 1 enable signal state	L-H	3b
i13	Ref 2 enable signal state	L-H	3c
i14	Limit switch 1 signal state	L-H	3d
i15	Limit switch 2 signal state	L-H	3e
i16	External current limit enable signal state	L-H	3f
i17	Alarm reset signal state	L-H	40
i18	Start pos. 1 signal state	L-H	41
i19	Start pos. 2 signal state	L-H	42
i20	Pos./Speed signal state	L-H	43
i21	Reference direction from volt./freq. conv. signal state	L-H	44
i22	Enable ramp signal state	L-H	45
i23	Alternative Start Pos.1 / Pos.2	L-H	46
i24	Main supply state	L-H	47
i25	External reference selection 0= analog, 1= frequency	L-H	48
i26	State of external sensor for positioning	L-H	49
i27	External sensor for double speed positioning state	L-H	4a
i28	Digital potentiometer "+" button state	L-H	4b
i29	Digital potentiometer "-" button state	L-H	4c
i30	Absolute position counter reset state	L-H	4d
	DESCRIPTION	STATE (H=ON L=OFF)	addr
o1	Logic output LO1 state	L-H	60
o2	Logic output LO2 state	L-H	61
o3	Logic output LO3 state	L-H	62
o4			63
o5			64
o6			65
o7			66
o8			67
o9	Drive ready signal state	L-H	68
o10	Motor thermal protection signal state	L-H	69
o11	Speed over minimum signal state	L-H	6a
o12	Drive on line signal state	L-H	6b
o13	CW rotation signal state	L-H	6c
o14	Saturation of speed regulator signal state	L-H	6d
o15	Ramp end signal state	L-H	6e
o16	Speed in range signal state	L-H	6f
o17	Current in range signal state	L-H	70
o18	Motor blocked signal state	L-H	71
o19	Stop in position signal state	L-H	72
o20	Ramp signal state	L-H	73
o21	Deceleration area	L-H	74
o22	Stop in Pos.1	L-H	75
o23	Stop in Pos.2	L-H	76
o24	Power relay state	L-H	77
o25	End of movement	L-H	78

4. MODBUS RTU SERIAL PROTOCOL

To select “standard ModBus RTU” protocol set **c57 = 1**.
The UART must be set as follows:

data	8 bit
parity	no
stop bit	1
hand shake	no

For the baud rate setting see following table:

	Baud rate
P79 = 0	9600
P79 = 1	19200
P79 = 2	38400

The master (PC or term.) initiates every query sending a message to the slave; transmitted data are placed into a frame with following format, and every message consists on one complete frame.

H	SA	FN	BC	DATA	CRC		E
4	1	1	1		Lo	Hi	4

H = header : wait for at least 4 byte
SA = slave address (1 byte) (1÷247).
FN = function code (1 byte)
BC = Byte count : n. of data bytes
CRC = CRC (Cyclical Redundancy Check) (2 byte)
E = end : wait at least 4 byte

It is possible to program in P70 a delay before the slave response, in case the master is slower.
If P70 = 0 the minimum delay is 4 byte time;
ES: P70 = 10 the delay time is 4 byte + 10ms
WARNING: BROADCASTING (SA=0) IS NOT SUPPORTED

4.1. INTERNAL REGISTER ADDRESS

Refer to the “User Manual” for the meaning of the parameters

address (hex)	standard address	parameter type	Functioncode R/W
100	40257	P1 - P120	03H/10H
200	40513	c1 - c100	03H/10H
300	40769	d1 - d20	03H/no
500	41281	A1 - A15	03H/no
030	00049	i1 - i24	01H/no
060	00097	o1 -o25	01H/no

4.2. FUNCTION CODES (FN FIELD):

n. (hex)	description
01	Read coil status
03	Read holding registers
10	Preset multiple registers

4.3. FUNCTION DESCRIPTION

4.3.1. FUNCTION 03H : READ HOLDING REGISTERS

This function is used to read parameters od type P, C, D, A.
Master request:

field	example (hex)
SA	11
FN	03
start address (Hi)	01
start address (Lo)	00
register number (Hi)	00
register number (Lo)	02
CRC (Lo)	xx
CRC (Hi)	xx

Drive answer:
At the address 100H are the “P” parameters
P1 = 0010H
P2 = 0302H

field	example (hex)
SA	11
FN	03
BC	04
P1 (Hi)	00
P1 (Lo)	10
P2 (Hi)	03
P2 (Lo)	02
CRC (Lo)	xx
CRC (Hi)	xx

WARNING: the maximum number of registers that can be written in the same request is 17

4.3.2. FUNCTION 10H : PRESET MULTIPLE REGISTERS

This function is used to write parameters of type P, C.
Master request to set P1 = 0100H and P2 = 0203H

field	example (hex)
SA	11
FN	10
start address (Hi)	01
start address (Lo)	00
register number (Hi)	00
register number (Lo)	02
BC	04
P1 (Hi)	01
P1 (Lo)	00
P2 (Hi)	02
P2 (Lo)	03
CRC (Lo)	xx
CRC (Hi)	xx

Drive answer:

field	example (hex)
SA	11
FN	10
start address (Hi)	01
start address (Lo)	00
register number (Hi)	00
register number (Lo)	02
CRC (Lo)	xx
CRC (Hi)	xx

WARNING: the maximum number of P, T and C parameters that can be written in the same request is 15.

4.3.3. FUNCTION 01H: READ COIL STATUS

This function is used to read parameters of type I, O.
Master request:

field	example (hex)
SA	11
FN	01
start address (Hi)	00
start address (Lo)	30
register number (Hi)	00
register number (Lo)	02
CRC (Lo)	xx
CRC (Hi)	xx

Drive answer:
At the address 30H are the “I” parameters
i1 = 1
i2 = 0

field	example (hex)
SA	11
FN	01
BC	01
Data 1	01
CRC (Lo)	xx
CRC (Hi)	xx

4.3.4. EXCEPTION CODES

If the master request causes an error, the drive answers with an exception rsponse:

field	example (hex)
SA	11
FN	zz
EC	yy
CRC (Lo)	xx
CRC (Hi)	xx

- In the FN field bit 80H is set
- The field EC (*Exception Code*) assumes one of the following values:
  - 01 = *Illegal Function*: FN field contains a not supported function code.
  - 02 = *Illegal Data Address*: the Master request refers to unknown parameters.
  - 03 = *Illegal Data Value*: the Master request contains invalid data (out-of-range values, too many registers in the same request, …).

- ***Notes***

1. For more details on parameters and working of the drive refers to "DMBL User Manual”
2. The “SCOPE” function is not supported

5. TDEMACNO COMMUNICATION PROTOCOL

To select TDEMACNO serial protocol set c57 = 0. Set the UART as follows:

data	8 bit
parity	no
stop bit	1
hand shake	no

For the baud rate setting see following table:

	Baud rate
P79 = 0	9600
P79 = 1	19200
P79 = 2	38400

Many drives (up to 32) can be connected on the same serial line. In this case a slave number can be assigned to the drives by setting **P51**. The default value is P51 = 255 (broadcast): if more than one drive on the same line have P51=255 the communication can not work correctly.
The master (PC or term.) initiates every query sending a message to the slave; transmitted data are placed into a frame with following format, and every message consists on one complete frame:

H	NS	TR	LD	DATA	XR	E
1	1	1	1	4	1	1

	Meaning	**Length**	**description**
H	= header	1 byte	"(" = 28H
NS[1]	= slave number	1 byte	1÷0FFH = 1÷255
TR	= record type	1 byte	
LD	= data length	1 byte	maximum 250=0FAH
XR	= XOR of all previous byte	1 byte	
E	= end	1 byte	")" = 29H

5.1. FUNCTION TABLE

n.	**record type**	**read**	**write**
1	machine state	01H	/
2	n.u.	02H	/
3	Displays	03H	/
4	Alarm displays	04H	/
5	Working parameters	05H	25H
6	n.u.	06H	/
7	Internal connections (c01÷c56)	07H	27H
8	n.u.	08H	/
9	n.u.	09H	/
10	direct commands (c41÷c56)	0AH	2AH

[1] If NS=255 (default) the data are received and handled from all the slaves connected with the serial line. If NS=254 the data are received and handled from all the slaves, with answer only from the slave having P51=1.

5.2. FUNCTION DESCRIPTION

5.2.1. MACHINE STATE

In the following table is described the composition of the DATA field:

read	write	answer
X000	/	A I O Y

every letter (or number) is a byte

In the following tables is explained the meaning of the bytes in the DATA field:

X= 0	⇒	input state + output state
X= 1	⇒	n.u.
X= 2	⇒	logic functions output state (o9 ÷ o24)
X= 3	⇒	logic functions output state (o25 ÷ o40)
X= 4	⇒	logic functions input state (i9 ÷ i24)
X= 5	⇒	logic functions input state (i25 ÷ i40)

X = 0	
AI =	input word status (valid inputs i1-:-i8)
O =	output status byte (valid output o1-:-o3)
Y =	80H = alarms on 40H = generic error 41H = request out of range 42H = parameter not enabled 43H = not allowed on line 44H = autotuning running

X = 2	
A=	X
I =	function bit o9 -:- o16 (o9 = lsb)
O =	function bit o17 -:- o24 (o17 = lsb)
Y =	see X=0

X = 3	
A=	X
I =	function bit o25 -:- o32 (o25 = lsb)
O =	function bit o33 -:- o40 (o33 = lsb)
Y =	see X=0

X = 4	
A=	X
I =	function bit i9 -:- i16 (i9 = lsb)
O =	function bit i17 -:- i24 (i17 = lsb)
Y =	see X=0

X = 5	
A=	X
I =	function bit i25 -:- i32 (i25 = lsb)
O =	function bit i33 -:- i40 (i33 = lsb) function bit
Y =	see X=0

Ex. : request of "logic function output state (o9 ÷ o24)" (X=2) to slave 1

28 01 00 04 02 00 00 00 2F 29

The drive answers:

28 01 00 04 02 01 00 80 AE 29 -> o9 active, alarms on

5.2.2. "D" DISPLAYS

In the following table is described the composition of the DATA field:

read	write	answer
N000	/	NABY

every letter (or number) is a byte

In the following tables is explained the meaning of the bytes in the DATA field:

BYTE	description
N =	number of requested "d" parameter
AB =	value (A = LSB)
Y =	80H = alarms on 40H = generic error 41H = request out of range 42H = parameter not enabled 43H = not allowed on line 44H = autotuning running

Ex. : request of "external speed reference" (d1)

28 01 03 04 01 00 00 00 2F 29

The drive answers:

28 01 03 04 01 84 00 80 2A 29

(84H = 3.2% with range 4096, 80H = alarm presence)

5.2.3. ALARM DISPLAYS

In the following table is described the composition of the DATA field:

read	write	answer
0000	/	0ABZ

every letter (or number) is a byte

In the following tables is explained the meaning of the bytes in the DATA field:

AB =	alarm word: 0002H = ram, eeprom error 0004H = power alarm 0008H = radiator thermal switch 0010H = motor thermal switch 0020H = motor in thermal overload 0040H = resolver failure 0080H = external alarm 0100H = overspeed 0200H = minimum voltage in the DC bus 0400H = overvoltage in the DC bus 0800H = logic inputs configuration error 1000H = poles setting error 2000H = mains connections error 4000H = mains supply not present
Z =	first alarm occurred

5.2.4. "P" PARAMETERS

In the following table is described the composition of the DATA field:

read	write	answer
N00K	NAB0	NABY

every letter (or number) is a byte

In the following tables is explained the meaning of the bytes in the DATA field:

N =	parameter number
AB =	value (A = LSB)
K =	0 = RAM value 1 = EEPROM value
Y =	80H = alarms on 40H = generic error 41H = request out of range 42H = parameter not enabled 43H = not allowed on line 44H = autotuning running

Ex. : setting P07 = 1000 = 3E8H in the slave 2

28 02 25 04 07 E8 03 00 E7 29

The drive answers:

28 02 25 04 07 E8 03 00 E7 29

5.2.5. "C" PARAMETERS

In the following table is described the composition of the DATA field:

read	write	answer
N00K	NX00	NX0Y

every letter (or number) is a byte

In the following tables is explained the meaning of the bytes in the DATA field:

N =	switch number
X =	value
K =	0 = RAM value 1 = EEPROM value
Y =	80H = alarms on 40H = generic error 41H = request out of range 42H = parameter not enabled 43H = not allowed on line 44H = autotuning running

Ex. : setting c35 = 1 in the slave 5

28 05 27 04 23 01 00 00 2C 29

The drive answers:

28 05 27 04 23 00 00 43 6E 29 (parameter not allowed on line)

5.2.6. DIRECT COMMANDS

In the following table is described the composition of the DATA field:

read	write	answer
/	N000	000Y

every letter (or number) is a byte

In the following tables is explained the meaning of the bytes in the DATA field:

N =	command number 1 (c41) default values recovering 2 (c42) eeprom values recovering 3 (c43) eeprom writing 4 (c44) resolver phase selftuning 5 (c45) current controller selftuining
Y =	80H = alarms on 40H = generic error 41H = request out of range 42H = parameter not enabled 43H = not allowed on line 44H = autotuning running

- ***NOTES***

1. Negative values are represented in two‘s complement

DMBL SERIAL LINE MANUAL V05

If you have any questions about equipment installation or working,
do not hesitate to contact us:

brushless.products@tdemacno.it

TDE MACNO
s.p.a. tecnologie digitali elettroniche

via dell'oreficeria, 41 36100 Vicenza tel.0444/343555
store: via dell'oreficeria, 27/B
Internet.address: http://www.tdemacno.com
Internet E-Mail: info@tdemacno.it
telefax 0444/343509