V1.0   20/07/2022   First Release

Curtis   **Controller: 1232SE5371   36/48V**
              350A (máx) 175A (S2-60mn)
              115A máx → Imáx = 33% of 350A
              Motor Type 117
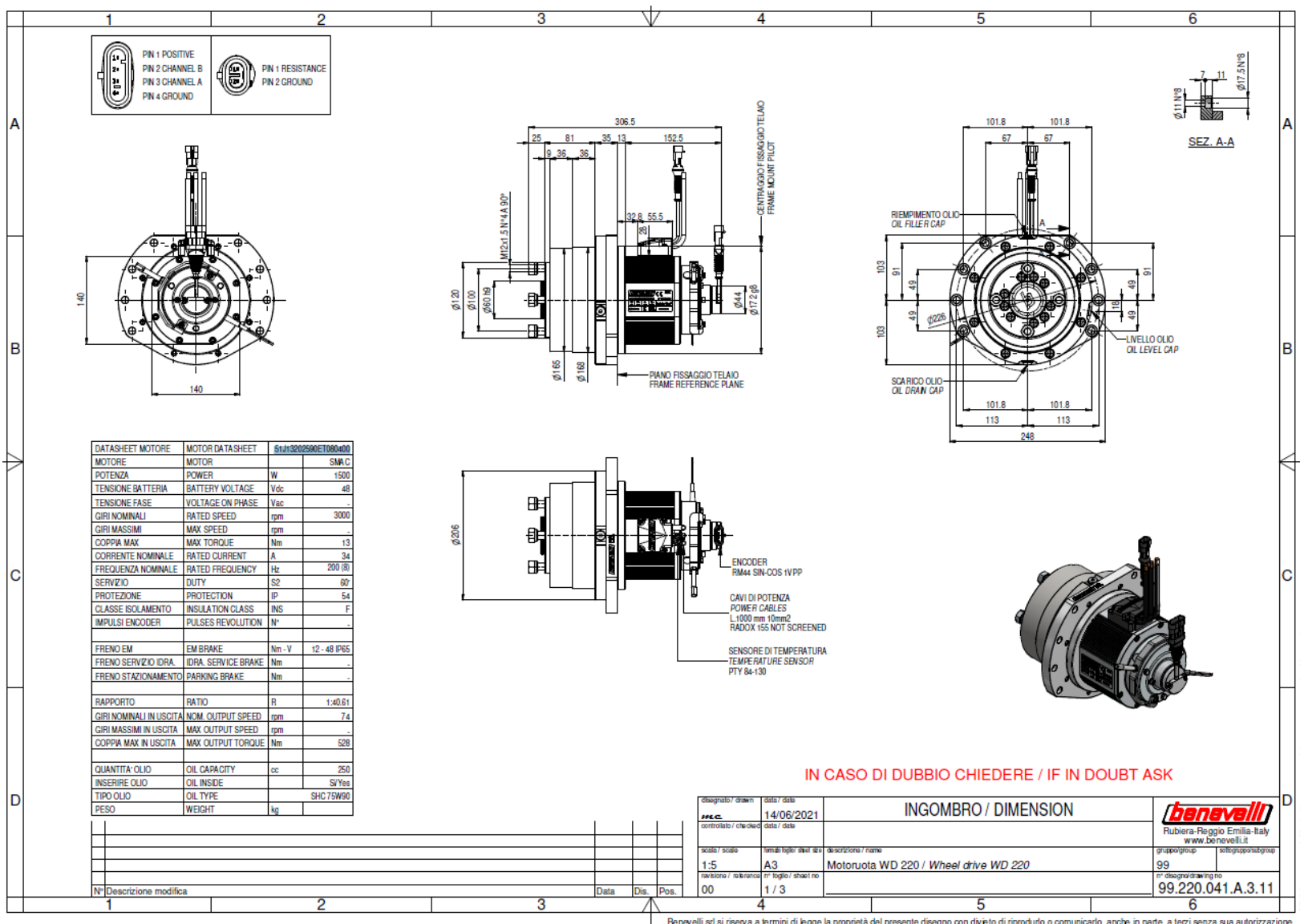   **EM Brake 48V**

CLIC on 1232 picture to download Manual

Albright   Main contactor Ref. SU80-5242P 54V CO

SU80 Technical Information

Application		Rating (I_{th})	
		Interrupted	Uninterrupted
Thermal Current Rating		150A	200A
Intermittent Current Rating:			
30% Duty		275A	365A
40% Duty		235A	315A
50% Duty		210A	285A
60% Duty		195A	260A
70% Duty		180A	240A
Rated Fault Current Breaking Capacity (Icn) 5ms Time Constant:			*(In accordance with UL583*)*
Blowouts		800A at 80V D.C.	
No Blowouts		800A at 48V D.C.	
Rated Fault Current Breaking Capacity (Icn) Resistive Load:			*(In accordance with UL508*)*
Blowouts		300A at 96V D.C.	
No Blowouts		300A at 60V D.C.	
Maximum Recommended Contact Voltages			
Blowouts		96V	96V
No Blowouts		48V	60V
Typical Voltage Drop per pole across New Contacts at 150A		40mV	
Mechanical Durability		> 3,000,000 Cycles	
Coil Voltage Available (Us) (Rectifier board required for A.C.)		6 - 240V	

SMAC132-025-90 48V   51J13202590ET080400   Type 1117 1500W 48V 34A S2 60' EM brake 12Nm 48V

DATASHEET MOTORE	MOTOR DATASHEET		51J13202590ET080400
MOTORE	MOTOR		SMAC
POTENZA	POWER	W	1500
TENSIONE BATTERIA	BATTERY VOLTAGE	Vdc	48
TENSIONE FASE	VOLTAGE ON PHASE	Vac	-
GIRI NOMINALI	RATED SPEED	rpm	3000
GIRI MASSIMI	MAX SPEED	rpm	-
COPPIA MAX	MAX TORQUE	Nm	13
CORRENTE NOMINALE	RATED CURRENT	A	34
FREQUENZA NOMINALE	RATED FREQUENCY	Hz	200 (8)
SERVIZIO	DUTY	S2	60'
PROTEZIONE	PROTECTION	IP	54
CLASSE ISOLAMENTO	INSULATION CLASS	INS	F
IMPULSI ENCODER	PULSES REVOLUTION	N°	-
FRENO EM	EM BRAKE	Nm - V	12 - 48 IP65
FRENO SERVIZIO IDRA.	IDRA. SERVICE BRAKE	Nm	-
FRENO STAZIONAMENTO	PARKING BRAKE	Nm	-
RAPPORTO	RATIO	R	1:40.61
GIRI NOMINALI IN USCITA	NOM. OUTPUT SPEED	rpm	74
GIRI MASSIMI IN USCITA	MAX OUTPUT SPEED	rpm	-
COPPIA MAX IN USCITA	MAX OUTPUT TORQUE	Nm	528
QUANTITA' OLIO	OIL CAPACITY	cc	250
INSERIRE OLIO	OIL INSIDE		Sì/Yes
TIPO OLIO	OIL TYPE		SHC 75W90
PESO	WEIGHT	kg	

IN CASO DI DUBBIO CHIEDERE / IF IN DOUBT ASK

disegnato / drawn	data / date		INGOMBRO / DIMENSION	**benevelli**
H.C.	14/06/2021			Rubiera-Reggio Emilia-Italy www.benevelli.it
controllato / checked	data / date			
scala / scale	formato foglio / sheet size	descrizione / name		gruppo/group / sottogruppo/subgroup
1:5	A3	Motoruota WD 220 / Wheel drive WD 220		99
revisione / tolerance	n° foglio / sheet no			n° disegno/drawing no
00	1 / 3			99.220.041.A.3.11

N° Descrizione modifica   Data Dis. Pos.

benevelli ELECTRIC POWERTRAIN SOLUTIONS	SMAC SERIE TECHNICAL DATA SHEET 3-PHASE SYNCHRONOUS MOTOR	Code	51J13202590ET080400
		Rev.	00
		Date	17/03/2021
		Page	1 di 2

Motor Rated Power			**1500W**	
Inverter Power Supply			**48Vdc**	

Description		Symbol	Unit		
Duty		-	-	S2-60min	
Nominal Speed		n_n	rpm	3000	
Frequency (N° poles)		$f\ (2p)$	Hz	200.0 (8)	
Costant Voltage		Ke	Vrms/Krpm	8.5	
Costant Torque		Kt	Nm/Arms	0.14	
Instant Torque		Ti	Nm	13.0	
Instant Current		Ii	Arms	115.0	
Peak Torque	S2-5min.	Tp	Nm	8.2	
Peak Current	S2-5min.	Ip	Arms	68.0	
Rated Torque	S2-60min.	Tr	Nm	4.3	
Rated Current	S2-60min.	Ir	Arms	34.0	
Rotor Inertia		Jr	kg x m^2	0.008	
Ambient Temperature		θa	°C	-15 ÷ +40	
Protection Degree		IP		IP 54	up to IP67
Insulation Class		-	-	F	
Thermal protection		-	-	KTY 84-130	
Cooling system				Air	

PRELIMINARY

benevelli	SMAC SERIE	Code	51J13202590ET080400
ELECTRIC POWERTRAIN SOLUTIONS	TECHNICAL DATA SHEET	Rev.	00
	3-PHASE SYNCHRONOUS MOTOR	Date	17/03/2021
		Page	2 di 2

Speed-Torque & Speed Power Motor Curves (*)

SMAC 132-025

Legend:
— Instant Torque
— Peak Torque S2-5'
— Rated Torque S2-60'
- - - Instant Power
- - - Peak Power S2-5'
- - - Rated Power S2-60'
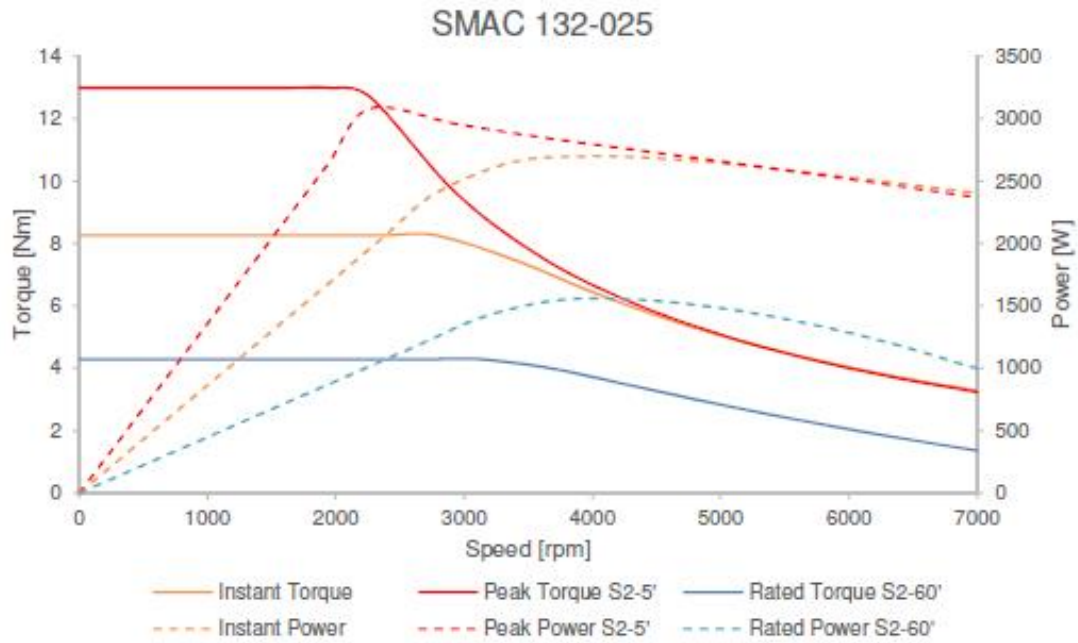
Efficiency Map % (*)
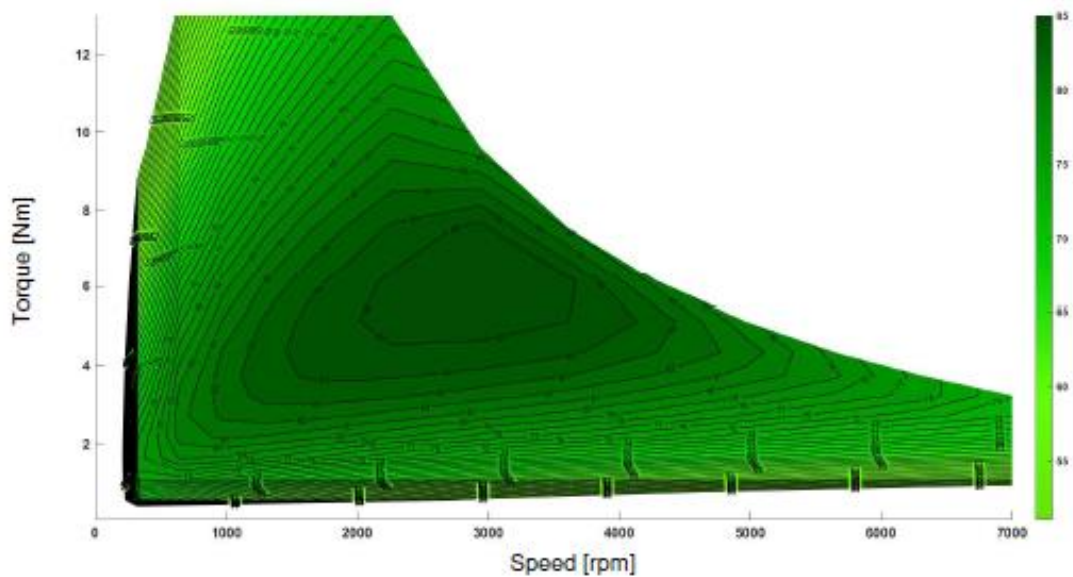
* MTPA Field Weakening strategy control & Optimized Advance Angle

0x200 + Node Id   CAN → Traction Controller

	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
	CAN_Motor_RPM_Request		CAN_Commands					
	L	H						
Format	Int 16		*See Note*					
Min/Max	-8000 / +8000 rpm							
	0xE0C0 / 0x1F40							

Speed Can be positive (Forward) or negative (Reverse).

CAN_Commands Note:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
						Reset	Interlock

0x180 + Node Id   Traction Controller → CAN

	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
	Controller Temperature		Motor Temperature		Motor rpm		Motor Current RMS	
	L	H	L	H	L	H	L	H
Format	Int 16		Int 16		Int 16		Uint 16	
Min/Max	-100 / +300ºC		-100 / +300ºC		-12000 / +12000 rpm		0.0 / 1000.0 A	
	0xFC18 / 0x0BB8		0xFC18 / 0x0BB8		0xD120 / 0x2EE0		0 / 0x2710	

0x280 + Node Id   Traction Controller → CAN

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Status 1	Status 2	Status 3	Status 4	Status 5	Status 6	Status 7	Status 8

If an error occurs in the Traction controller, we can identify it according to the following table:

Status 1	**Status 2**
Bit0 = Main Contactor Welded (Code 38)	Bit0 = HPD/Sequencing Fault (Code 47)
Bit1 = Main Contactor Did Not Close (Code 39)	Bit1 = Severe B+ Undervoltage (Code 17)
Bit2 = Pot Low OverCurrent (Code 45)	Bit2 = Severe B+ Overvoltage (Code 18)
Bit3 = Throttle Wiper Low (Code 42)	Bit3 = B+ Undervoltage Cutback (Code 23)
Bit4 = Throttle Wiper High (Code 41)	Bit4 = B+ Overvoltage Cutback (Code 24)
Bit5 = Pot2 Wiper Low (Code 44)	Bit5 = Sin/Cos Sensor Fault (Code 88)
Bit6 = Pot2 Wiper High (Code 43)	Bit6 = Controller Overtemp Cutback (Code 22)
Bit7 = EEPROM Failure (Code 46)	Bit7 = Controller Severe Undertemp (Code 15)

Status 3	**Status 4**
Bit0 = Controller Severe Overtemp (Code 16)	Bit0 = Precharge Failed (Code 14)
Bit1 = Coill Driver Open/Short (Code 31)	Bit1 = Digital Out 6 Overcurrent (Code 26)
Bit2 = Coi12 Driver Open/Short (Code 32)	Bit2 = Digital Out 7 Overcurrent (Code 27)
Bit3 = Coil3 Driver Open/Short (Code 33)	Bit3 = Controller Overcurrent (Code 12)
Bit4 = Coi14 Driver Open/Short (Code 34)	Bit4 = Current Sensor Fault (Code 13)
Bit5 = PD Open/Short (Code 35)	Bit5 = Motor Temp Hot Cutback (Code 28)
Bit6 = Main Open/Short (Code 31)	Bit6 = Parameter Change Fault (Code 49)
Bit7 = EMBrake Open/Short (Code 32)	Bit7 = Motor Open (Code 37)

Status 5	**Status 6**
Bit0 = External Supply Out of Range (Code 69)	Bit0 = Bad_Calibrations_Fault (Code 82)
Bit1 = Motor Temp Sensor Fault (Code 29)	Bit1 = [Not Used]
Bit2 = VCL Run Time Error (Code 68)	Bit2 = Emer Rev HPD (Code 47)
Bit3 = +5V Supply Failure (Code 25)	Bit3 = [Not Used]
Bit4 = OS General (Code 71)	Bit4 = Motor Type Fault (Code 89)
Bit5 = PDO Timeout (Code 72)	Bit5 = Supervisor Fault (Code 77)
Bit6 = Encoder Fault (Code 36)	Bit6 = Motor Characterization Fault (Code 87)
Bit7 = Stall Detected (Code 73)	Bit7 = [Not Used]

Status 7	**Status 8**
Bit0 = [Not Used]	Bit0 = [Not Used]
Bit1 = VCL/OS Mismatch (Code 91)	Bit1 = [Not Used]
Bit2 = EM Brake Failed to Set (Code 92)	Bit2 = [Not Used]
Bit3 = Encoder LOS (Limited Operating Strategy) (Code 93)	Bit3 = Parameter Mismatch (Code 99)
Bit4 = Emer Rev Timeout (code 94)	Bit4 = Severe KSI Undervoltage (Code 17)
Bit5 = Dual Severe Fault (Code 75)	Bit5 = [Not Used]
Bit6 = Fault On Other Traction Controller (Code 74)	Bit6 = [Not Used]
Bit7 = Illegal Model Number (Code 98)	Bit7 = Encoder Pulse Count Fault (Code 88)

Note: See also *User Fault 1* & *Status 9* in next TxPDO (0x380 + Node Id).

0x380 + Node Id   Traction Controller → CAN

	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
	Capacitor Voltage		Keyswitch Voltage		Status 9	User Fault 1		
	L	H	L	H	See Note 1	See Note 2		
Format	UInt 16		UInt 16					
Min/Max	0.0 / 200.0V		0.0 / 105.0V					
	0x0000 / 0x3200		0x0000 / 0x2904					

Note1: Status 9

Bit0 = Supervisor Incompatible (Code 78)

Bit1 = [Not Used]

Bit2 = [Not Used]

Bit3 = PMAC Commissioning Needed (Code 19)

Bit4 = [Not Used]

Bit5 = [Not Used]

Bit6 = Driver Supply (Code 83)

Bit7 = [Not Used]

Note 2: User Fault 1:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
							VCL Fault 1

VCL Fault 1 (code 51) PDO from ECU is Time out.

0x700 + Node Id   NMT Traction Controller

0x80 + Node Id   EMCY Traction Controller

Ver documento "NTJP20161130 EMCY en 123x.pdf" para la explotación de este Mensage.