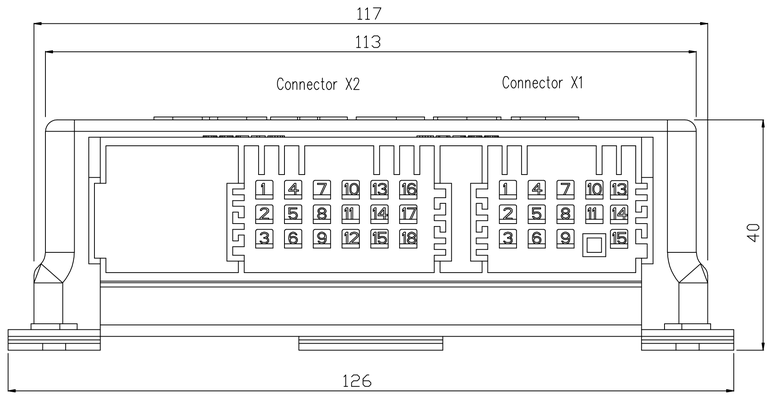
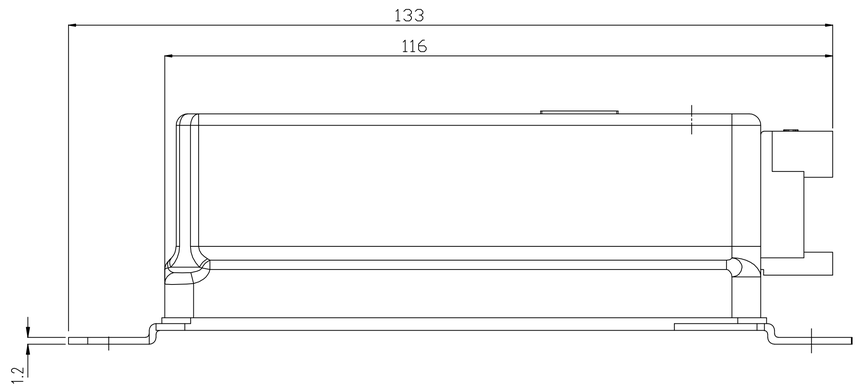
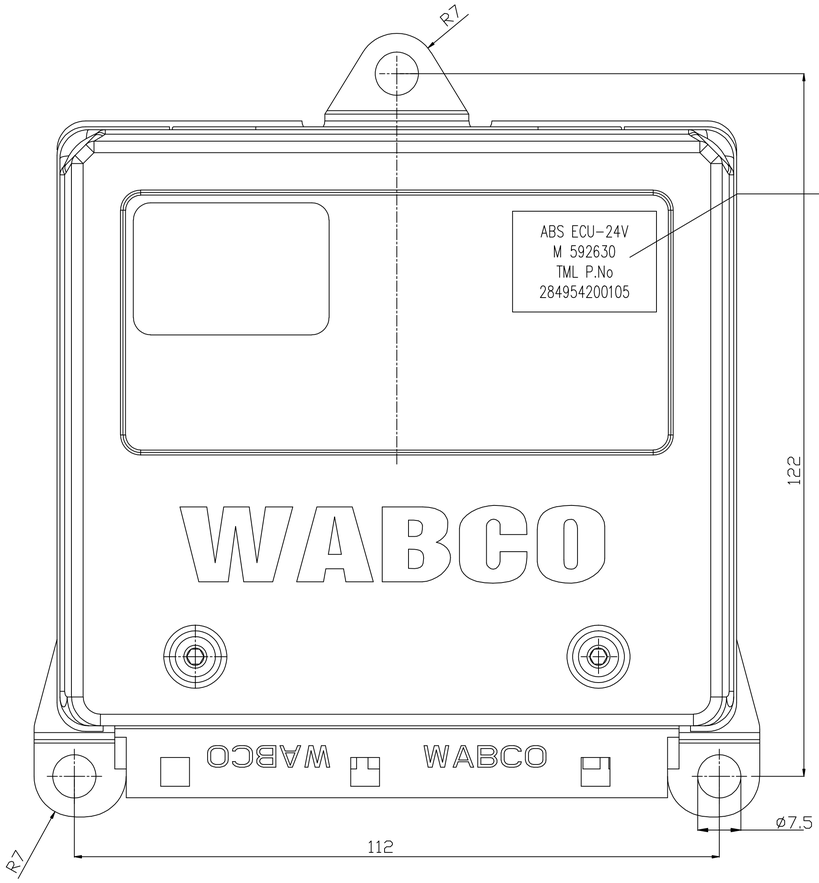
PART No.
M 592630 GA

ENGINEERING CHANGES			
ECN No.	DATE	REV	SIGN
10259	06.07.06	New	RBS
10447	27.10.06	1	RBS
ECU Part No. added.			
10889	31.01.08	2	RBS
Drawing pictorially modified inline with label. Drawing redrawn.			
12083	16.03.11	3	RBS
Drawing template WABCO was SUNDRAM CLAYTON LTD.Drawing redrawn.			

DO NOT SCALE IF IN DOUBT ASK

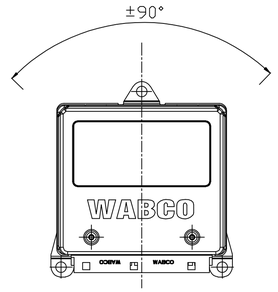


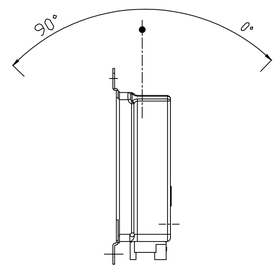




CUSTOMER PART No.
LABEL SHOWN HERE

INSTALLATION POSITION:





VOLTAGE	: $24V^{+8}_{-7}$ V DC
MODE OF PROTECTION	: IP 40 (IEC 529)
THERMAL RANGE OF APPLICATION	: −40°C...+75°C
STORING TEMPERATURE	: −40°C...+100°C
MALE MULTIPOINT CONNECTOR	: SURFACE PROTECTION, TINNED
ECU Part Number	: 446 004 622 0

Date	Mod No	SL No	Modification	DO	CHK	APP

TATA MOTORS PART/DESC : ECU, ABS-E,WABCO

TATA MOTORS PART NO :

● CRITICAL
◐ MAJOR
NO SYMBOL – MINOR

PART CODE	MATERIAL	SURFACE PROTECTION
XVII	STEEL	NO TREATMENT
XVI	CAST IRON	PLATED
XV	STEEL	ZINC-IRON PLATED
XIV	CAST IRON	NO TREATMENT
XIII	ZINC ALLOY	ANODISED
XII	PLASTIC	NO TREATMENT
XI	RUBBER	NO TREATMENT
X	STAINLESS STEEL	NO TREATMENT
IX	BRASS	NO TREATMENT
VIII	ZINC ALLOY	CHROMATED
VII	ALUMINIUM ALLOY	ANODISED
VI	ALUMINIUM ALLOY	CHROMATED
V	CAST IRON	PAINTED
IV	STEEL	POWDER COATED
III	STEEL	PAINTED
II	STEEL	PHOSPHATED
I	STEEL	ZINC PLATED

	SIGN	DATE		
MATERIAL		13.03.11	RAW PART No.	--
SURFACE PROTECTION	SN	13.03.11	ALTERNATE MATERIAL	--
	RBS	13.03.11	SURFACE PROTECTION	REFER TABLE
DRN	BSN	13.03.11		
CHD				
APD				

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN mm

REMOVE BURRS AND SHARP EDGES FROM FINISHED PARTS
ALL DIMENSIONS ARE AFTER SURFACE PROTECTION / TREATMENT

MALE THREAD TO IS 14962 (Part 3) 6h : 2001
FEMALE THREAD TO IS 14962 (Part 3) 6H : 2001

GENERAL TOLERANCES

RANGE OF NOMINAL DIMENSIONS (± mm)				∠	FORCE, POWER, PRESSURE etc.,
≤ 50	> 50 ≤ 180	> 180 ≤ 400	> 400	(± °)	(± %)
1	2	3	4	3	10

100 mm

SCALE 2:1

WABCO
AMBATTUR, CHENNAI – 600058, INDIA

ELECTRONIC CONTROL UNIT
ABS-E BASIC 4S/4M 24V,KWP2000

PART No. M 592630 GA
SHEET 1 OF 3

PART No. M 592630 GA

ENGINEERING CHANGES			
ECN No.	DATE	REV	SIGN
10259	06.07.06	New	RBS
10447 Refer sheet 1.	27.10.06	1	RBS
12083 Revision details refer sheet 1.	16.03.11	2	RBS

DO NOT SCALE IF IN DOUBT ASK

Technical Data: –
Housing

The ECU housing consists of steel. The printed circuit board is fastened on the bottom plate by screws and is protected by a cover, Which closes the housing like a shell. The cover is fastened by screws.

Dimensions and mounting
The dimensions of the ECU housing as well as the recommended position of installation can be found on the outline drawing (code 605)

Weight of the ECU
max.400 g

Marking
The ECU is marked in accordance with JED341.

Connector Plugs
The electronic control unit is connected via the following harness connector plugs.

	Connector plug	AMP –no.
X1	14 pin connector	1355206-1
X2	18 pin connector	1-967624-1

The contact surfaces must be tinned.

Attention: The contacts pin 9 and pin 15 of the 14 pin connector have to be special partial gold plated contacts.The AMP number for selected gold plated terminal is 927768-9(>1.0–2.5mm ^{2})

S.No	Terminal Description	AMP –no.	Used in
1	Tin plated terminal (1.5mm^2 to 2.5mm^2)	0-0927768-3	Modulator valve harness & power harness
2	Tin plated terminal (0.5mm^2 to 1.0mm^2)	0-0927771-3	Sensor harness
3	Selected gold plated terminal	0-0927768-9	Central ground in Power harness

The plug connectors are not specified by WABCO.The declaration of part numbers from the connector manufacturer is only a non-binding support for the construction of the cable harness.

ELECTRICAL SPECIFICATIONS: –

General
Unless otherwise noted the values of the electrical specification are valid for room temperature (25° c).

All inputs and outputs are protected against short circuit to ground or to battery voltage.

Assuming correct system wiring no current will flow through the modulator valve solenoids should the supply voltage be reversed.

Power supply

connector	pin	name	remarks
X1	4	GND	ECU–GND
	7	U_{ECU}	ECU supply voltage.
	8	U_B	supply voltage for the A1 and A2 valves
	9	GND2	second GND for warning lamp

Symbol	Definition	min	typ	max	Unit
U_{ECU},U_B	ECU supply voltage *)		24	32	V
$U_{ECU\ max}$ $U_{B\ max}$	max. DC supply voltage for 1h (Tu = 25°C) ABS and ATC functions not available			36	V
$U_{lowthres}$	low voltage threshold **)	17	18	19	V
$U_{ovthres}$	overvoltage threshold ***)	32			V
U_{rip}	alternator ripple at supply voltage 50 Hz – 10 kHz sinusoidal, U_B = 24 V			±2.5	V
U_{rev}	voltage of reverse polarity			$-U_{Bat}$	V
I_E	ECU supply current at U_{ECU} and U_B together at nominal supply voltage (ABS inactive) ****)			500	mA
$I_{PC,UB}$	peak current during ABS–function at U_B, all valves activated.			18	A

*) The electronic fails safe by destroying the external fuses caused by an irreversible internal overvoltage protection released by supply voltage >36V.

**) All functions based on valve control will be switched off on a time basis. Depending on the voltage demanded by solenoid valves a higher voltage may be necessary before the ECU can activate the internal relays.

***)Over voltage is detected with a delay to prevent fault detection in case of pulse conditions.

****)The supply current does not include current due to loads (lamps and relays) connected to the ECU.After switch on an additional current pulse flows to load an input capacitor.

PERMISSIBLE CONDITIONS OF USE
ENVIRONMENTAL CONDITIONS

Temperature range				
	min	max	Unit	Conditions
operating temp.	–40	+75	°C	50 mm separation from parts effecting air circulation. Min. air speed 0.2 m/sec. Should this condition not be fulfilled, it is alternately acceptable that the surface temperature of the housing may be +75°C max.
storage temp.	–40	+90	°C	2h max.
	–40	+100	°C	

Connector Pin Details

connector	pin	name	remarks
X1	4	GND	ECU–GND
	7	U_{ECU}	ECU supply voltage.
	8	U_B	supply voltage for the A1 and A2 valves
	9	GND2	second GND for warning lamp
	10	K Line	K Line for diagnostics
	14	DBR	Third brake relay connection
	15	WL	Warning lamp connection

Connector Pin Details

connector	pin	name	remarks
X2	1	FR–MV–EV	FR– MV– Inlet
	2	RL–MV–EV	RL–MV–Inlet
	3	FL–MV–EV	FL– MV– Inlet
	4	FR–MV–AV	FR– MV– Outlet
	5	RL–MV–AV	RL– MV– Outlet
	6	FL–MV–AV	FL– MV– Outlet
	8	RR–MV–EV	RR– MV– Inlet
	9	RR–MV–AV	RR– MV– Outlet
	10	FR–IGM	FR sensor ground
	11	RL–IGM	RL sensor ground
	12	FL–IGM	FL sensor ground
	13	FR–IG	FR sensor Input
	14	RL–IG	RL Sensor Input
	15	FL–IG	FL sensor Input
	17	RR–IGM	RR Sensor ground
	18	RR–IG	RR Sensor Input

Date	Mod No	SL No	Modification	DO	CHK	APP

TATA MOTORS PART/DESC : ECU, ABS–E,WABCO

TATA MOTORS PART NO :

● CRITICAL
◐ MAJOR
NO SYMBOL – MINOR

XVII	STEEL	NO TREATMENT
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III	STEEL	PAINTED
II	STEEL	PHOSPHATED
I	STEEL	ZINC PLATED
PART CODE	MATERIAL	SURFACE PROTECTION

	SIGN	DATE	MATERIAL	––
DRN	BSN	13.03.11	ALTERNATE MATERIAL	––
CHD	RBS	13.03.11	SURFACE PROTECTION	REFER TABLE
APD	SN	13.03.11	RAW PART No.	––

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN mm
REMOVE BURRS AND SHARP EDGES FROM FINISHED PARTS
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MALE THREAD TO IS 14962 (Part 3) 6h : 2001
FEMALE THREAD TO IS 14962 (Part 3) 6H : 2001

GENERAL TOLERANCES

RANGE OF NOMINAL DIMENSIONS (± mm)				∠	FORCE, POWER, PRESSURE etc.,
≤ 50	> 50 ≤ 180	> 180 ≤ 400	> 400	(± °)	(± %)
1	2	3	4	3	10

100 mm

WABCO
AMBATTUR, CHENNAI – 600058, INDIA

SCALE 2:1

ELECTRONIC CONTROL UNIT
ABS–E BASIC 4S/4M 24V,KWP2000

PART No. M 592630 GA
SHEET 2 OF 3

PART No.
M 592630 GA

ENGINEERING CHANGES

ECN No.	DATE	REV	SIGN
10259	06.07.06	New	RBS
10447 Refer sheet 1.	27.10.06	1	RBS
12083 Revision details refer sheet 1.	16.03.11	2	RBS

DO NOT SCALE IF IN DOUBT ASK

ENVIRONMENT TEST: –

The final qualification of ECU will combine several environmental tests in the following sequence:

Step	Test	according to	Units	Temp.	test conditions
1	Function test	–	5	–40°C +85°C +25°C	Storage time before measuring: 1h or at least until temperature is balanced.
2	Dry heat test	IEC–68–2–2,Bb	5	+85°C	Test time: 72h power supply cyclic 1h ON/1h OFF
3	Cold test	IEC–68–2–1,Ab	5	–40°C	Test time: 72h power supply cyclic 1h ON/1h OFF
4	Thermal cycling test	IEC–68–2–14,Nb	5	–40°C +85°C	30 cycles with 1h at –40°C and 1h at 85°C. Speed of temperature change: 3°C/min. Test concludes with a function test at 25°C
5	Damp heat test	IEC–68–2–30,Db	5	+55°C	6 cycles with power supply cyclic 1h ON/1h OFF. Test concludes with a function test at 25°C
6a	Vibration test (sinusoidal)	IEC–68–2–6, Fc	3*)	+25°C	10 cycles in frequency range of 5 Hz to 300 Hz f≤ 11 Hz: deflection ±11mm const. (corresponds 1,1g with 5 Hz and 5g with 11 Hz) f≥ 11 Hz: acceleration 5g const. Test concludes with a function test at 25°C and a visual inspection.
6b	Vibration test (random)	IEC–68–2–35,Fda	3	+25°C	f=10Hz...500Hz,RMS 3.3g, 24h each axis.
7	Shock test	IEC–68–2–27,EA	3	+25°C	30g/18ms, half sinus, 3 shocks in every 3 axis and every 2 directions.
8	Handling test Drop test	SAE J1455	3	+25°C	3 success drops from a height of 1m onto a level concrete surface.
9	EMC test	ISO 11452/4	1	+25°C	Test conditions and result see chapter 3.2.6 Immunity to Electromagnetic Radiation

*) 2 units will be used as backup.

Type of protection

According to IEC 529: IP 40

Electromagnetic Compatibility

Electrical Disturbance by Conduction

The test is made in accordance with ISO 7637–2 (first edition 1990–06–01).

The electronic unit is protected against the pulses 1a, 2, 3a,3b(pulses) and 5 (loaddump)with test level IV.The ECU remains at functional status class A.

With pulse 4 (starting procedure) the behaviour of the ECU is the same as after switch on.

Conducted Transient Emission

The test is made in accordance with ISO 7637–2.

The electronic control unit corresponds to the transient emission test level 1.

Electrical Disturbance by Capacitive Coupling

The test is made in accordance with ISO 7637–3 (first edition 1995–07–15)

The electronic control unit is protected against the pulses a and b with test level IV. The ECU remains at functional status class A.

Electrical disturnbance by electrostatic discharges(ESD)

Electronic module test

This test is made in accordance with ISO/DIS 10605(Oct 1999)/SAE J1113/13(Feb 1995).

The electronic control unit withstands electrostatic discharges(direct contact and air discharge) with test level IV.The ECU remains at functional status class A.

Packaging and handling

This test is made in accordance with ISO/DIS 10605.(Oct 1999).

The electronic control unit withstands electrostatic discharges (direct contact and air discharge) with test level III.The ECU remains at functional status class A.

Radiated emission:

Measurement of the radiated emission of the ABS–ECU in the board network is made following to DIN EN 55025.

The ECU corresponds to the following emission levels:

Frequency range[MHz]	Interference level
LW (0.15–0.3)	4
MW (0.53–2.0)	5
KW (5.9–6.2)	5
VHF1 (30–54)	5
VHF2 (70–108)	5

IMMUNITY TO ELECTROMAGNETIC RADIATION: –

The assessment of the ABS–ECU is made with the BCI–method according to ISO 11452/4 under the following conditions:

modulation frequnecy : 1kHz/15 Hz

modulation degree : Switch–over between 95 % resp. 80 % and 0% at any step of amplitude

speed sensor frequency : 0 Hz (V = 0 km/h) and 250 Hz (V = app.30 km/h)

Abbrevations Used:

ECU : Electronic Control Unit

FR : Front Right
RL : Rear Left
RR : Rear Right
FL : Front Left
A1 : Front Axle
A2 : Rear Axle

DBR : Third Brake Relay Output
IGM : Sensor Ground
IG : Sensor Input
EV : Inlet Valve
AV : Outlet Valve
U_{ECU}: Supply Voltage for ECU
U_B : Supply voltage for A1 and A2 valves
WL : Warning Lamp output

Date	Mod No	SL No	Modification	DO	CHK	APP

TATA MOTORS PART/DESC : ECU, ABS–E,WABCO

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◐ MAJOR
NO SYMBOL – MINOR

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PART CODE	MATERIAL	SURFACE PROTECTION

	SIGN	DATE	MATERIAL	––
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MALE THREAD TO IS 14962 (Part 3) 6h : 2001
FEMALE THREAD TO IS 14962 (Part 3) 6H : 2001

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SCALE 2:1

ELECTRONIC CONTROL UNIT
ABS–E BASIC 4S/4M 24V,KWP2000

PART No. M 592630 GA
SHEET 3 OF 3