



AVL 

Balai Pengujian Laik Jalan and Sertifikasi Kendaraan Bermotor (BPLJSKB)

HUBDAT R49: ANNUAL PREVENTIVE MAINTENANCE 2023

AVL Proposal: 0395250-02
12. June 2023

PRICING

Pos	Qty	Item Name	Price in € / Total Net
1	1	HUBDAT R49: ANNUAL PREVENTIVE MAINTENANCE 2023	93,070.00
1.1	1	HUBDAT R49: ANNUAL PREVENTIVE MAINTENANCE 2023	31,653.00
1.1.1	1	AVL SPARE PARTS FOR GPUi60 consisting of:	
1.1.1.1	1	MAINT. KIT CLD I60 VACUUM PUMP	
1.1.1.2	1	MAINTENANCE KIT ANNUAL RAW STREAM	
1.1.1.3	3	MAINTENANCE KIT AMA I60 PUMP SAMPLE/BYP.	
1.1.2	1	AVL SPARE PARTS FOR FID i60 HHD consisting of:	
1.1.2.1	1	MAINTENANCE KIT ANNUAL HEATED FID I60	
1.1.2.2	1	MAINTENANCE KIT AMA I60/PSSI60 HFID PUMP	
1.1.2.3	1	CONVERTER FILLING FID I60 (METHAN)-KIT	
1.1.3	1	AVL SPARE PARTS FOR FID i60 LHD x 2 consisting of:	
1.1.3.1	2	MAINTENANCE KIT ANNUAL HEATED FID I60	
1.1.3.2	2	MAINTENANCE KIT AMA I60/PSSI60 HFID PUMP	
1.1.3.3	2	CONVERTER FID I60	
1.1.4	1	AVL SPARE PARTS FOR CLD i60 HH consisting of:	
1.1.4.1	1	MAINTENANCE KIT HEATED CLD I60 ANNUAL	
1.1.4.2	1	CONVERTER CLD FILLING SET HIGH	
1.1.5	1	AVL SPARE PARTS FOR CLD i60 LC consisting of:	
1.1.5.1	1	MAINTENANCE KIT COLD CLD I60 ANNUAL	
1.1.5.2	1	FILTER PROBE 20 MV 8.5	
1.1.5.3	1	CONVERTER CLD FILLING SET LOW	
1.1.6	1	AVL SPARE PARTS FOR IPC AND MSR consisting of:	
1.1.6.1	1	FILTER PAD IPC I60	
1.1.6.2	1	FAN GUARD ASSEMBLY 60X60MM PLASTIC BLACK	

Pos	Qty	Item Name	Price in € / Total Net
1.1.7	1	AVL SPARE PARTS FOR PRE-FILTER G02 x 2 consisting of:	
1.1.7.1	2	MAINTENANCE KIT 12 MONTHS PREFILTER G02	
1.1.7.2	1	THERM.TRANSF.COMP FEROTHERM 4 300 DEG.	
1.1.8	1	AVL SPARE PARTS FOR AVL439 consisting of:	
1.1.8.1	1	MAINTENANCE KIT AVL 439	
1.1.9	1	AVL SPARE PARTS FOR SPC 478 consisting of:	
1.1.9.1	1	1YR MAINT KIT SPC478 CC/FC (FC REV G6)	
1.1.10	1	AVL SPARE PARTS FOR FWC consisting of:	
1.1.10.1	1	WEAR PART PACKAGE GMC18-MK3 SMALL	
1.1.11	1	AVL SPARE PARTS FOR CDY consisting of:	
1.1.11.1	1	FILTER MAT	
1.1.12	1	AVL SPARE PARTS FOR CORRECTIVE consisting of:	
1.1.12.1	2	PRESSURE SENSOR 0-2BAR DIFF.PRESSURE	
1.1.13	1	AVL SPARE PARTS FOR ENGINE TEST BED consisting of:	
1.1.13.1	1	MAINTENANCE KIT AVL 753C-600 FF	
1.1.13.2	1	ANNUAL MAINTENANCE KIT AVL 735	
1.1.13.3	1	MAINTENANCE KIT AVL CC 450	
1.1.13.4	1	ANNUAL MAINTENANCE KIT CONSYS AIR 2400	
1.1.13.5	2	CARTRIDGE REGREASEING UNIT CVS BLOWER	
1.1.13.6	1	ANNUAL MAINTENANCE KIT AVL 442 600&1200	
1.1.14	1	ANNUAL PREVENTIVE MAINTENANCE SERVICES	44,206.00
		consisting of:	
1.1.14.1	1	AVL SEA & AUSTRALIA SERVICE FOR PREVENTIVE MAINTENANCE	
1.1.14.2	1	FREIGHT AND SHIPPING COST	

Pos	Qty	Item Name	Price in € / Total Net
1.1.14.3	1	LABOUR SUPPORT FOR PREVENTIVE MAINTENANCE	
1.1.14.4	1	SERVICE TOOLS AND CONSUMABLE SUPPORT	
1.1.15	1	AVL ON-SITE SERVICE SUPPORT PACKAGE	10,456.00
		consisting of:	
1.1.15.1	1	AVL SEA & AUSTRALIA SERVICE FOR ON-SITE SERVICE SUPPORT <u>6 DAYS PER YEAR / R49 TESTBED</u>	
1.1.15.2	1	1 LICENSE OF CASE MANAGEMENT	
1.1.15.3	1	ACCOMMODATION AND TRAVEL COST	
1.1.15.4	1	HARD DISK FOR CUSTOMER BACKUP SW ON AVL SIMULATOR	
1.1.16	1	AVL SERVICES CALIBRATION	6,755.00
		consisting of:	
1.1.16.1	1	CALIBRATION LAMINAR FLOW ELEM. SPC478 <i>*incoterm: EXW, customer is responsible for shipment*</i>	
1.1.16.2	1	CALIBRATION CHINO WEATHER STATION	
Total Price Net (Excl. Taxes)			93.070,00

CONDITIONS

Payment Terms	30% Down Payment upon PO 30% after spare parts arrive 30% after performing main services: PM, but not later than 5 months after PO date. 10% after end of contract, each 30 days from date of invoice, net
Dispatch Terms	by air freight
Delivery Terms	CIP, at HUBDAT R49
Delivery Time	Within 4-12 weeks from receipt of technically and commercially clarified written order. Please note that due to the current COVID-19 pandemic, some electronic components may be delayed due to lack of availability. AVL will make every effort to meet the delivery dates quoted.
Validity	30 days from date of proposal
Warranty Parts	90 days after delivery (wear and consumable parts excluded)
Warranty Service	30 days after service acceptance.

OFFERING DESCRIPTION

Technical details to the offered scope can be found in the technical appendix.

1 HUBDAT R49: ANNUAL PREVENTIVE MAINTENANCE 2023

1.1 HUBDAT R49: ANNUAL PREVENTIVE MAINTENANCE 2023

1.1.1 AVL SPARE PARTS FOR GPUi60

1.1.1.1 MAINT. KIT CLD I60 VACUUM PUMP

Note:

Exchange may only be carried out by qualified and authorized personnel! Please contact your local AVL service organization to request service assistance.

Scope of Supply:

4 Diaphragm
8 Valves
1 Diaphragm wrench

1.1.1.2 MAINTENANCE KIT ANNUAL RAW STREAM

In the following cases we recommend to order additionally:

Every 6000 operating hours:

- 1 Pump Kit for vacuum pump
- 1 Pump Kit for measuring gas pump
- 1 Pump Kit for bypass pump

Notes:

- Please note that maintenance kits for FID and CLD analyzers as well as EGR/Tracer stream and for all pumps have to be considered separately.
- Also cleaning concentration TICKOPUR (R27) is not included in the scope of supply of the maintenance and has to be considered separately.

Scope of Supply:

- 1 Filter pad for IPC
- 2.5m Hose silicone tube 4x1.5
- 2 Tubing assembly with SS-line
- 1 Filter element 100mm
- 2.5m Hose PFA 2x1
- 1 O-Ring FPM-Temperature resis. 36x2
- 1 Sound absorber
- 10 Set clamp rings front + back Ø 6" SS
- 5m Hose, silicone tube 4x5
- 2m Hose-PFA, diameter: 4.0x1.0
- 1 O-Ring Viton diameter 36.00x4.00

1.1.1.3 MAINTENANCE KIT AMA I60 PUMP SAMPLE/BYP.

Scope of Supply:

- 1 Diaphragm for pump (KNF)
- 1 Valve pad for pump (KNF)

1.1.2 AVL SPARE PARTS FOR FID i60 HHD

1.1.2.1 MAINTENANCE KIT ANNUAL HEATED FID I60

In the following cases we recommend to order additionally:

Every 2000 operating hours:

1 Pump Kit for FID i60

If the converter efficiency of FID i60 is too low:

- 1 Converter filling FID i60

Scope of Supply:

- 4 O-Rings 3x1 FFKM75
 - 1 O-Ring 27x3.2 FKM75
 - 3 O-Rings 6.75x1.78 FKM75
 - 1 O-Ring 37.821 X 1.78 FFKM75
 - 12 O-Rings 4,2x1,2 FKM70
 - 2 Glow plugs
 - 2 Washers ISO 7089 - 3 - AL
 - 1 Gasket detector cover FID
 - 15 Sealing rings 4.9x8.6x1
 - 6 O-Rings 3x1.3 FFKM75
 - 2 Gasket plate capillary FID
 - 1 Filter element Ø 32x 1.66, 2 MY
 - 0.2m Hose silicone tube
 - 1 Sound absorber
- 1 O-Ring 42.00x1.50 FKM75

1.1.2.2 MAINTENANCE KIT AMA I60/PSSI60 HFID PUMP

Scope of Supply:

- 1 x Diaphragm for FID pump
 - 2 x Valve plates
 - 2 x O-Rings PTFE
 - 1 x 0.2m Hose silicone tube
- 4 x Hose clamp 8.3-8.8

1.1.2.3 CONVERTER FILLING FID I60 (METHAN)-KIT

Scope of Supply:

- 12 ccm converter material FID
 - 1 Snap-on-lid glass + PE seal
 - 2 Gasket converter HHD
 - 2 Gasket gas introduction converter
 - 2 High grade steel tissue-disc Ø10.00
 - 2 Pressure spring VD-091
 - 2 Disc Ø10.00-3.00
 - 10 Fill head screw ISO 7045 M3x6 4.8
 - 2 Socket head cap screw ISO 4762 M4x30 4.8
 - 2 Flat washer ISO 7089 4
 - 2 Split lock washer DIN 127 A 4
- 1 Tube ID=10 OD=12 PFA nature (3 cm)

1.1.3 AVL SPARE PARTS FOR FID i60 LHD x 2

1.1.3.1 MAINTENANCE KIT ANNUAL HEATED FID I60

For the technical details please refer to pos 1.1.2.1

1.1.3.2 MAINTENANCE KIT AMA I60/PSSI60 HFID PUMP

For the technical details please refer to pos 1.1.2.2

1.1.3.3 CONVERTER FID I60

Note:



Exchange may only be carried out by qualified and authorized personnel! Please contact your local AVL service organization to request service assistance.

1.1.4 AVL SPARE PARTS FOR CLD i60 HH

1.1.4.1 MAINTENANCE KIT HEATED CLD I60 ANNUAL

It is recommended to order additional following maintenance kits:

- 1 x Replacement O-rings ozone connection

Every 6000 operating hours:

- 1 x Pump kit for vacuum pump
- 1 x Pump kit for bypass pump

If the converter efficiency of CLD i60 is too low:

- 1 x Converter filling CLD i60

Note:

BW1119SP "Converter CLD set high" is declared as a dangerous good acc. IATA UN 1362 and therefore **no longer** part of the Maintenance Kit CLD i60!

BW1119SP requires a special shipment. For further information please contact your local service organization.

Scope of Supply:

- 2 x Sealing ring CU-A1 10.00x14.00x2.00
- 1 x Filling deozonator (CU-balls)
- 2 x O-ring 01.50x1.50 FKM80
- 1 x O-ring 36.00x2.00 FKM75
- 8 x O-ring 05.50x1.00 FKM75
- 15 x O-ring 04.00x1.20 FKM75
- 1 x Bypassfilter
- 1 x Filter insert 50-05-CS
- 6 x O-ring 03.00x1.00 FKM75
- 1 x Filter element Ø 32.00x1.66 2.0 µm
- 4 x O-ring 01.42x1.52 FFKM75
- 1 x Filter active carbon one way
- 1 x O-ring 27.00x3.20 FKM75
- 3 x O-ring 06.75x1.78 FKM75

1.1.4.2 CONVERTER CLD FILLING SET HIGH

Note:

The procedure for exchanging the converter material must be strictly followed in accordance with the instructions in the AMA i60 & AMA i60 SII maintenance guide!

Scope of Supply:

- 1.1 ccm Converter material CLD
- 3 High grade steel plates
- 2 Disc Ø10.00-3.00
- 1 Tube 10x001 PFA (0.03 m)
- 1 Shortneck bottle
- 1 Sealing ring CU-A1-10x14x2
- 6 O-ring 4.00x1.20 FKM75
- 1 O-ring 6.00x1.00 FFKM75
- 1 O-ring 6.00x1.00 FKM80

1.1.5 AVL SPARE PARTS FOR CLD i60 LC

1.1.5.1 MAINTENANCE KIT COLD CLD i60 ANNUAL

It is recommended to order additional following maintenance kits:

- 1 x Replacement O-rings ozone connection

Every 6000 operating hours:

- 1 x Pump Kit for Vacuum Pump

If the converter efficiency of CLD i60 is too low:

- 1 x Converter filling CLD i60

Note:

BW1119SP "Converter CLD set high" is declared as a dangerous good acc. IATA UN 1362 and therefore no longer part of the Maintenance Kit CLD i60!

BW1119SP requires a special shipment. For further information please contact your local service organization.

Scope of supply:

- 1 x Deozonator filling (CU balls)
- 6 x O-ring 3.00x1.00 FKM75
- 6 x O-ring 1.50x1.50 FKM80
- 8 x O-ring 5.50x1.00 FKM75
- 1 x O-ring 4.00x1.20 FKM75, 15 pieces
- 2 x O-ring 1.42x1.52 FFKM75
- 1 x Filter active carbon one way
- 2 x Sealing ring CU-A1 10x14x2

1.1.5.2 FILTER PROBE 20 MV 8.5

Filter Probe 20 my Ø 8.5x1.66
20µm

Note:

Exchange may only be carried out by qualified and authorized personnel! Please contact your local AVL service organization to request service assistance.

1.1.5.3 CONVERTER CLD FILLING SET LOW

Note:

The procedure for exchanging the converter material must be strictly followed in accordance with the instructions in the AMA i60 & AMA i60 SII maintenance guide!

Scope of supply:

- 0.5 ccm converter CLD filling CT-06 (MO-3/1)
- 4 High grade steel tissue disc
- 2 Disc Ø10.00-3.00
- 1 Tube 010x001 PFA (0.03 m)
- 1 Narrow-necked bottle, 10 ml, with cap
- 1 Sealing ring CU A1-10x14x2
- 6 O-ring 4.00x1.20 FKM75
- 1 O-ring 6.00x1.00 FFKM75
- 1 O-ring 6.00x1.00 FKM80

1.1.6 AVL SPARE PARTS FOR IPC AND MSR

1.1.6.1 FILTER PAD IPC I60

Scope of supply: one pack = 10 pieces

1.1.6.2 FAN GUARD ASSEMBLY 60X60MM PLASTIC BLACK

No further technical information

1.1.7 AVL SPARE PARTS FOR PRE-FILTER G02 x 2

1.1.7.1 MAINTENANCE KIT 12 MONTHS PREFILTER G02

For easy mounting of the heated metal below valves we recommend using the high temperature resistant and hydrocarbon-free mounting fat HS0065SP that has to be considered separately.
Every 5 years or 10000 operating hours we recommend to exchange the metal bellow valves (BW6828SP) that have to be considered separately.

Scope of supply

Each consisting of:

- 1 O-ring set for the prefilter
- 1 screw M3
- 4 filters for fan
- 1 ceramics filter D=30mm, L=75mm, 1µm
- 1 silencer
- 3 screws M4x8 Eco Fix
- 3 washers for M4

1.1.7.2 THERM.TRANSF.COMP FEROTHERM 4 300 DEG.

No further technical information

1.1.8 AVL SPARE PARTS FOR AVL439

1.1.8.1 MAINTENANCE KIT AVL 439

We recommend to replace every 3000-4000 operating hours:
1 diaphragm pump (MV0141SP)

Scope of supply:

- 1 Tube 6.0X2.0 Viton black (2,5m)
- 1 Tube 10.0X2.0 Viton 200°C black (1,5m)
- 1 Tube 4.0X1.0 Viton black (1,1m)
- 1 Tube 4.0X1.5 SI Natur (1,2m)
- 1 Straight Muff Male Screw
- 3 T-Hose connections 6 mm
- 22 Hose Clamps 10.4 – 11 mm
- 2 Hose Clamps 12-18 mm
- 5 Cable Connectors
- 1 Straight Connector
- 1 T-Muff male screw connection 6 mm
- 2 Wear parts set for pump 7015
- 1 Filter Inset
- 1 Lamp element
- 1 O-Ring 10.82x1.78
- 1 O-Ring 29.74x3.53
- 1 O-Ring 73.5x3.5 ACM-70SHORE
- 2 O-Rings 50.00x2.00
- 2 Sealing cones
- 2 Pressure Springs 174 mm long

1.1.9 AVL SPARE PARTS FOR SPC 478

1.1.9.1 1YR MAINT KIT SPC478 CC/FC (FC REV G6)

Consists of:

- 1x Filter element for filter F01 (compressed air)
- 1x Filter element for filter F03 (dilution air)
- 1x Filter element for filter F10 (dilute sample return)
- 5x Filter element for filter F06 (bypass filter)
- 5x Silicon gasket 1 1/2"
- 1x O-ring upper cone #230, 70mm (10 PC)
- 5x O-ring upper cone #223, 47mm
- 5x O-ring Viton #224
- 5x O-ring upper cone #235, 70mm
- 1x Filter mat RIGID blue
- 1x Filter fiber
- 2x Tunnel fan filter
- 1x Filter mat
- 1x CAP: bypass filter retainer
- 1x BOWL: bypass filter
- 1x O-ring 42,52x2,62mm NBR70
- 1x Filter element F06 (bypass filter)
- 1x SPC 478 filter holder assembly guidance

1.1.10 AVL SPARE PARTS FOR FWC

1.1.10.1 WEAR PART PACKAGE GMC18-MK3 SMALL

Consists of:

- 1x Reverse osmosis equipment complete
- 1x Prefilter Z-Line Filter G5

1.1.11 AVL SPARE PARTS FOR CDY

1.1.11.1 FILTER MAT

Filter Mat

1.1.12 AVL SPARE PARTS FOR CORRECTIVE

1.1.12.1 PRESSURE SENSOR 0-2BAR DIFF.PRESSURE

Note:

Exchange may only be carried out by qualified and authorized personnel! Please contact your local AVL service organization to request service assistance.

1.1.13 ANNUAL PREVENTIVE MAINTENANCE SERVICES

Scope of Supply:

- Emission Maintenance work from experienced emission engineers for a duration of *12 working days by 1 engineer*, based on regular work time.
- Engine Test Bed System Maintenance work from experienced emission engineers for a duration of *12 working days by 1 engineer*, based on regular work time.
- One (1) Day (8 hours) AVL Service Engineer
- Including PM parts procurement, preparation work and reporting.
- Including necessary travel time and expenses.

Valid for

- Monday – Friday (Except for public holiday)
- Time 9.00 - 18.00
- Travelling (AVL Office to Customer)
- Hotel required

Scope of Work:

- List of annual preventive maintenance and schedule refer to [Engine Test Bed](#)

No.	Description	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6	DAY7	DAY8	DAY9	DAY10	DAY11	DAY12
Pre Check		✓											
PUMA OPEN 2													
1	Cleaning system surface and operating desk	✓	✓										
2	Verification and re-tightening of mechanical connection points	✓											
3	Replace maintenance kit parts	✓	✓										
4	Tightening of all electrical connection points	✓	✓										
5	Functional check Digital IN/OUT (by SW)	✓	✓										
6	Functional check set values analog outputs (By SW)	✓	✓										
7	Functional check analog inputs (by SW)	✓	✓										
8	Functional check of all fans	✓	✓										
9	Functional check PC-System	✓	✓										
10	Back up database	✓	✓										
11	Check UPS functionality	✓	✓										
12	Check AC/DC power supply (in the control cabinet)	✓	✓										
13	Check Thermostat setting	✓	✓										
14	Safety function check (TBM)	✓	✓										
EMCON 400													
1	Torque measurement	✓	✓	✓									
2	Speed measurement	✓	✓	✓									
3	Engine over torque monitoring	✓	✓	✓									
4	Engine over Speed monitoring	✓	✓	✓									
5	Emergency stop	✓	✓	✓									
6	Watchdog PUMA	✓	✓	✓									
7	Check all regulation modes (Ignition, Start, Stop, Idle, Idle control, N/T, N/A, T/N and T/A)	✓	✓	✓									
8	Back up database (Parameter files)	✓	✓	✓									
9	Safety function check (EMCON monitoring)	✓	✓	✓									
THA120													
1	Cleaning system surface			✓									
2	Replacing of air filters			✓									
3	Tightening of all electrical connection points			✓									
4	Calibration of servo motor position			✓									
5	Power supply check (5G1)			✓									
6	Check Thermostat setting (5A1)			✓									
2 F-FEM-AIS (ANALOG INPUT)													
1	Cleaning system surface				✓	✓	✓						
2	Verification and re-tightening of mechanical connection points				✓	✓	✓						
3	Tightening of all electrical connection points				✓	✓	✓						
4	Calibration check of each channel with voltage, current, PT100 and TC-K				✓	✓	✓						

No.	Description	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6	DAY7	DAY8	DAY9	DAY10	DAY11	DAY12
FEM-DAC (ANALOG OUTPUT)													
1	Cleaning system surface				✓	✓	✓						
2	Verification and re-tightening of mechanical connection points				✓	✓	✓						
3	Tightening of all electrical connection points				✓	✓	✓						
4	Calibration check of each channel with 2 output types (voltage and current)				✓	✓	✓						
F-FEM-DDC(ANALOG OUTPUT)													
1	Cleaning system surface				✓	✓	✓						
2	Verification and re-tightening of mechanical connection points				✓	✓	✓						
3	Calibration check of each channel with 2 output types (voltage and current)				✓	✓	✓						
4	Check functionality of all output				✓	✓	✓						
FEM-DIO (DIGITAL INPUT/OUTPUT)													
1	Cleaning system surface				✓	✓	✓						
2	Verification and re-tightening of mechanical connection points				✓	✓	✓						
3	Check functionality of all input/output				✓	✓	✓						
F-FEM-P (PRESSURE INPUT)													
1	Cleaning of sensor				✓	✓	✓						
2	Functional check FEM-P sensor connection				✓	✓	✓						
3	Calibration check				✓	✓	✓						
FFEM-CON													
1	Cleaning system surface				✓	✓	✓						
2	Verification and re-tightening of mechanical connection points				✓	✓	✓						
3	Tightening of all electrical connection points				✓	✓	✓						
4	Calibration check of each channel with 2 output types (voltage and current)				✓	✓	✓						
5	Calibration check of each channel with 2 input types (voltage and current)				✓	✓	✓						
AVL 442 BLOW BY METER													
1	Complete cleaning unit surface			✓									
2	Cleaning of orifice and replace the o-rings			✓									
3	Check of all connection points and retighten them			✓									
4	Power supply check			✓									
5	Analog and RS 232 Functional check			✓									
6	Calibration check			✓									
7	Cleaning dumper tanks (by using pure gasoline)			✓									
AVL 553 COOLANT CONDITIONING UNIT (AVL 553-450)													
1	Water leak check							✓					
2	Cleaning of water filter							✓					
3	Functional check control valve							✓					
4	Check temperature sensor							✓					
5	Check and adjustment of control parameters							✓					
6	Tightening of all electrical connection point at the controller							✓					
7	Decalcification of water circuit							✓					
8	Cleaning of sight glass - cleaning inside if possible							✓					
9	Check of U/P converter							✓					
10	Cleaning of cabinet and air filters							✓					
11	Replace maintenance kit parts							✓					
12	Check coolant Safety valve							✓					
13	Check Motor Pump - Coil impedance							✓					
DYNAMOMETER													
1	[DYNO]- Surface cleaning								✓				
2	[DYNO]- Check torque measurement device (Loadcell)								✓				
3	[DYNO]- Calibration of torque measurement								✓				
4	[DYNO]- Put grease in NDE and DE side bearings								✓				
5	[DYNO]- Check condition of cooling fan (Using Current Clamp in Dyno cabinet)								✓				
6	[DYNO]- Cleaning of Dyno cooling fan								✓				
7	[DYNO]- Check of all mechanical fittings/screw on tightness (Tightening Torque)								✓				
8	[DYNO]- Vibration check								✓				
9	[DYNO]- Check Impedance of exiter coils - Coil-Coil and Coil to GND								✓				
10	[Cabinet]- Cleaning of control cabinet inside and outside								✓				
11	[Cabinet]- Cleaning of all PCB in the cabinet								✓				
12	[Cabinet]- Power supply check (AC-DC)								✓				
13	[Cabinet]- Check of all connection points and retighten them (Tightening Torque)								✓				
14	[Cabinet]- Check IGBT modules								✓				
15	[Cabinet]- Check communication EMCON - APA								✓				

No.	Description	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6	DAY7	DAY8	DAY9	DAY10	DAY11	DAY12
FUEL MASS FLOW METER (AVL 735S)													
1	Cleaning system surface									✓			
2	Fuel leak check (zero consumption measurement)									✓			
3	Check of horizontal/vertical alignment									✓			
4	Check compressed air switch									✓			
5	Check overflow float switch									✓			
6	Check flow sensor									✓			
7	Check tank level sensor									✓			
8	Check pressure regulator									✓			
9	Check Emergency Stop relay									✓			
10	Replace spare parts maintenance kit									✓			
11	Check fuel pump operating time - after exceeding the maintenance limit (5,000 hrs) , replacement should be offered									✓			
12	Check filling valve operating time - after exceeding the maintenance limit (500,000 switching operations) replacement should be offered									✓			
13	Power supply check									✓			
14	Check of RS232 serial communication/connection									✓			
15	Check of all connection points and retighten them									✓			
16	Check the shut-off valve ON/OFF									✓			
AVL 753 FUEL CONDITIONING SYSTEM													
1	Complete cleaning of unit										✓		
2	Fuel leak check										✓		
3	Water leak check										✓		
4	Exchange fuel filter (Paper)										✓		
5	Reset Fuel filter Maintenance limit counter (by PC SW.)										✓		
6	Cleaning water filter										✓		
7	Cleaning of fine and coarse filters - Fuel supply line										✓		
8	Power supply check										✓		
9	Check of all connection points and retighten them										✓		
10	Adjustment of controller outputs for control value 0-100%										✓		
11	Functional check of flow sensor										✓		
12	Replacement maintenance kit parts										✓		
13	Check venting function - if venting valve available										✓		
14	Check heater's coil impedance at cable no.2 (solid state relay) and 12 (Terminal)										✓		
Air Intake Conditioning(ACS2400)													
1	Water leak check											✓	
2	Cleaning of water filter											✓	
3	Functional check control valve											✓	
4	Check temperature sensor											✓	
5	Check and adjustment of control parameters											✓	
6	Tightening of all electrical connection point at the controller											✓	
7	Compressed air leak check											✓	
8	Check blower motor resistance											✓	
9	Check of Heater resistance											✓	
10	Replacement maintenance kit parts											✓	
11	Cleaning of cabinet and air filters											✓	
12	Check voltage and current main system											✓	
13	Open and close Consyscool cover											✓	
Post Check													✓
Report													✓

Scope of Work:

- List of annual preventive maintenance and schedule refer to [Emission Test Bed](#)

No.	Description	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6	DAY7	DAY8	DAY9	DAY10	DAY11	DAY12
Pre Check													
1	Pre Check	✓											
AMAI60													
2	Clean surface of cabinet and fan		✓										
3	Leak check		✓										
GPU i60													
4	General check, Clean the surface of device		✓										
5	Humidity sensor function check		✓										
PDU i60													
6	General check, Clean the surface		✓										
GNU 64 iCAL													
7	Check the function of valves		✓										
AMA i60 (FID)													
8	Check temperature pump			✓									
9	Check temperature inside device			✓									
10	Check temperature flame			✓									
11	Check voltage detector			✓									
12	Check current glow plug			✓									
13	CH4 - Linearize check (1 ranges)			✓									
14	CH4 - Cutter efficiency check			✓									
15	THC - Linearize check (1 ranges)			✓									
16	THC - HC Hang-up check			✓									
17	THC - HC Response check			✓									
CLD i60													
18	Check temperature reaction chamber				✓								
19	Check temperature converter				✓								
20	Check temperature inside device				✓								
21	Check temperature chiller				✓								
22	Check current chiller				✓								
23	Check current ozonator				✓								
24	Check voltage photomultiplier				✓								
25	NOx - Linearize check (1 ranges)				✓								
26	NOx - Converter check				✓								
IRD i60 CO L (ABB)													
27	CO L - Linearize check (1 ranges)					✓							
28	CO L - Cross sensitivity check					✓							
IRD i60 CO H / CO2 / O2 (FR)													
29	CO H - Linearize check (1 ranges)					✓							
30	CO2 - Linearize check (1 ranges)					✓							
31	O2 - Linearize check (1 ranges)					✓							
32	CO H - Cross sensitivity check					✓							
33	CO2 - Cross sensitivity check					✓							

No.	Description	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6	DAY7	DAY8	DAY9	DAY10	DAY11	DAY12
HSS Pre Filter Raw Gas													
34	Perform backflush (if installed)						✓						
35	Perform leak check						✓						
36	Clean main filter element (ultrasound bath) with backflush option						✓						
37	Clean main filter element (ultrasound bath) without backflush option						✓						
38	Check & Clean main filter element						✓						
39	Clean inlet filter element (only with backflush option)						✓						
40	Clean inlet filter element (by executing the backflush function)						✓						
41	Check & Clean inlet filter element						✓						
42	Clean flame trap (by executing the backflush function)						✓						
43	Mechanically clean flame trap						✓						
44	Replace O-rings						✓						
45	Check overtemperature protector						✓						
46	Check bellows valves												
47	Clean the blocks that get in contact with sample gas						✓						
48	Clean or replace fan filter						✓						
49	Check for contamination (visual check)						✓						
50	During maintenance, check for contamination and damage						✓						
51	Check servo control valves							✓					
52	Check safety elements							✓					
53	Check pressure sensors							✓					
54	Check flow rate sensor							✓					
55	Check temperature sensors							✓					
56	Replace ambient air filters							✓					
HSS Pre Filter EGR													
57	Perform backflush (if installed)								✓				
58	Perform leak check								✓				
59	Clean main filter element (ultrasound bath) with backflush option								✓				
60	Clean main filter element (ultrasound bath) without backflush option								✓				
61	Check & Clean main filter element								✓				
62	Clean inlet filter element (only with backflush option)								✓				
63	Clean inlet filter element (by executing the backflush function)								✓				
64	Check & Clean inlet filter element								✓				
65	Clean flame trap (by executing the backflush function)								✓				
66	Mechanically clean flame trap								✓				
67	Replace O-rings								✓				
68	Check overtemperature protector								✓				
69	Check bellows valves								✓				
70	Clean the blocks that get in contact with sample gas								✓				
71	Clean or replace fan filter								✓				
72	Check for contamination (visual check)								✓				
73	During maintenance, check for contamination and damage								✓				
74	Check servo control valves									✓			
75	Check safety elements									✓			
76	Check pressure sensors									✓			
77	Check flow rate sensor									✓			
78	Check temperature sensors									✓			
79	Replace ambient air filters									✓			

No.	Description	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6	DAY7	DAY8	DAY9	DAY10	DAY11	DAY12
SMART SAMPLER SPC 478													
80	[Main cabinet]-Sensor calibration: Calibration.									✓			
81	[Main cabinet]-Gprobe Check: Check.									✓			
82	[Main cabinet]-GtotCal/GdilCal: Check.									✓			
83	[Filter Panel and AFC Automatic filter panel]- Sensor Calibration: NA												
84	[GEM140 services]- Leak check: Check.									✓			
85	[GEM140 services]- Temperature and pressure sensor: Calibration.									✓			
86	[Sensor to be calibrated]- Dilution air temp: Check									✓			
87	[Sensor to be calibrated]- Filter face temp: Check									✓			
88	[Sensor to be calibrated]- Texh, Exhaust temp:Check										✓		
89	[Sensor to be calibrated]- LFE temp: Check										✓		
90	[Sensor to be calibrated]- Absolute pressure sensor: Check										✓		
91	[Sensor to be calibrated]- LFE differential pressure sensor: Check										✓		
92	[Sensor to be calibrated]- Voltage input1: Check										✓		
93	[Sensor to be calibrated]- Voltage input2: Check										✓		
94	functional check										✓		
AVL 439 Opacimeter													
95	Cleaning of system surface											✓	
96	Cleaning of window element											✓	
97	Leak check											✓	
98	Linearity check with neutral density filters											✓	
99	Check RS 232 interface											✓	
100	Flow Calibration											✓	
101	Temp Gas Calibration											✓	
102	Temperature MK Calibration											✓	
103	Pressure Calibration											✓	
104	Functional test											✓	
Filter Weighing Chamber													
105	Cleaning Bench												✓
106	Fuse Check												✓
107	Chiller Check & Water Supply												✓
108	Air Filter Replacements												✓
109	Osmosis Filter replacements												✓
Post Check													
													✓

1.13.2 FREIGHT AND SHIPPING COST

Included freight, shipment packing, transportation and/or partial delivery charges if needed.

- Handling shipment from GRAZ-PORT, JKT
- According to Incoterm agreement: CIP

1.1.13.3 LABOUR SUPPORT

Labour support included for preventive maintenance and calibration that mentioned in the scope of work by Third-Party.

1.1.13.4 SERVICE TOOLS AND CONSUMABLE SUPPORT

carry out the services as mentioned in the scope of service, the following tools will be used.

- General mechanical tools
- General electrical tools
- Consumable material i.e. cleaner, chemical, filter mats
- Instruments for calibration check as mentioned in scope of calibration service

1.1.14 AVL ON-SITE SERVICE SUPPORT PACKAGE

SERVICE CONTRACT CONDITIONS

- The contract is valid until end of **31st December 2023**
- For service support comprises of
 - 6 M-day of On-Site support per testbed per year (0.5 day to be added on a round trip travelling from AVL Jakarta – HUBDAT)
- The remaining amount of “Service Support” M.day in the past contract year can be forwarded to next year order. The carried forward amount are only valid for 1 year.

On-site Support for which has been annually maintained and calibrated by AVL qualified engineers.

CONDITION & PREREQUISITION

- Condition of all the device and equipment in the testbed are known and listed in the PM annual report.
- Photos or Videos of some hardware device must be allowed to share with AVL support engineer.
- Up to date data back up and image back up of all PC, PLC, Inverter drives, etc are available during recent maintenance & commissioning work at site and at AVL office.

ON-SITE SUPPORT:

Scope of Works

- On-site support for testbed by AVL experience engineer during regular work time.
- Pre check of system condition
- On-site Inspection & troubleshooting by experience qualified engineer
- Contact 2nd level support if required
- Identify damage parts and request for repair quotation for customer if required
- Post check of overall system condition before leaving site
- Prepare site troubleshooting & service report submitted to customer and update status in AVL eCase

REMARKS:

Work hours are calculated based on standard working time. In the urgent case which required overtime work or weekend work then the M-day are to be booked by factor of 1.5 of actual time spent (over time rate).

Case Management is a time based (annually) renewable AVL service contract which provides a maximum of **1 named user** from the same customer site **access to the Case Management application**. This online portal is embedded in *My AVL Cockpit* and supports the customer while resolving service requests related to AVL test systems and instrumentation:

- Submit issues to the AVL support organization
- Track the solution progress of cases in real-time
- Receive notifications when customer actions are required
- Find all case-related information in one place
- Analyze case data via built-in dashboards

An overview of current cases containing the status of the solution progress and the ability to view required customer actions, ensures an efficient way of working. Commitments and results are documented within Case Management which enable clear communication between the customer and the AVL support organization. Dashboards and customizable reports enable high-level information visibility and facilitate fact-based communication with test operations, management, and AVL.

Note:

- For access to *My AVL Cockpit* and activation of Case Management/Service Slot Booking dedicated information on customer contacts (unique email addresses, access type, etc.) is required. Sales will be in contact with the customer to collect the required data. After all the required data is collected and validated, access to Case Management will be provided within 5 working days.
- By ordering a dedicated Case Management article, access to Case Management will be granted to the respective number of users. Important: The users must be from the same customer site (account name/site). If the users are located at different customer sites, an additional order must be placed.
- Spare parts and hardware maintenance or repairs are not part of Digital Interaction and must be ordered separately.
- Efforts for device calibration are not part of Digital Interaction and must be ordered separately.
- Support related to the use of the AVL equipment focusing on operations, application or training of engineers are not part of Digital Interaction and can be ordered separately.

Scope of supply

- 5 nights of Accommodation in the area near by customer site
- 6 days of travel allowances
- 6 days of local transportation

All the charges will be deducted per actual trips and accommodations on each customer visit trip, remaining amount of trips and accommodations can be carried forward to next year service contract.

1.1.15 AVL SERVICES CALIBRATION

1.1.15.1 CALIBRATION LAMINAR FLOW ELEM. SPC478

Calibration interval recommendation:

24 months

Adjustment:

If the measured values happen to be outside the specified tolerances an appropriate adjustment will be carried out.

Calibration Certificate:

A calibration certificate attests for the customer the proper functioning of the measurement device within the specified tolerances.

Turnaround Time:

Typically 25 working days (from the reception of the part or product at the Calibration Centre Graz-Austria).

Logistic time including customs clearance (goods inbound AVL, shipment to customer):

- EU: Typically 6 working days
- Asia, America, Middle East and Turkey: Typically 20 working days
- Brazil, India and CIS: Typically 30 working days

Pricing System:

The calibration will be carried out at the indicated flat rate.

Notes:

- If the original specification cannot be met through adjustment but requires repair of the device, this will be offered and charged separately.

Calibration will be started after written confirmation by the customer.

Remark:

EX-work, all calibrators shipment is handled by customer for Round-trip

1.1.15.2 CALIBRATION CHINO WEATHER STATION

These devices included with traceable certificates for calibration check of the equipment mentioned in the scope of work by Third-Party.

Please contact our **AVL HOTLINE SEA & Australia Co., Ltd** for further information.

Email: hotline.asean@avl.com

Tel: +66 (0) 2 299 0555

TERMS AND CONDITIONS

The current version of AVL and its affiliate companies General Terms and Conditions applies, which we will send on request.

This offer is subject to the relevant export regulations from EU and/or US authorities and the settlement at time of delivery of the goods. No claims whatsoever can be accepted resulting from late delivery or cancellation due to late receipt or refusal of export approval by the responsible authorities.

The delivery periods and delivery dates specified by AVL in this offer are subject to the timely availability of purchases on the procurement market, as no corresponding binding commitments are possible due to the current tense market situation. Accordingly, if AVL is unable to meet a deadline due to a lack of availability or untimely availability of purchases despite the implementation of all necessary and reasonable measures, AVL shall immediately notify customer thereof in writing. Subject to AVL's fulfillment of the aforementioned requirements, AVL shall not be liable for any consequences of delay. In this case, the parties shall mutually agree on a corresponding extension of milestones and/or deadlines.