Viper SD-4 RTC Night VFR

Powerplant installation definition

Compiled by:	Verified by:	Released by:	Reg. Mark./ Storage Period: K.16/ during the period aeroplane operation
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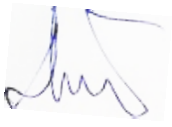
Date: 13.DEC 2021	Date: 14.DEC 2021	Date: 14.DEC 2021	
Signature: 	Signature: 	Signature: 	Copy no.:

Amendments

Issue	Reason	Date
A	Initial issue	28.MAR 2018
B	Differences between TOM-TC-01-C1-010 and TOM-TC-15-C1-010 added	18.OCT 2018
C	Coolant thermostat change, oil hoses change	15.JAN 2020
D	Coolant thermostat change	14.DEC 2021

References

/1/	SD4-B-6-001-N-1#1	Powerplant unit with external alternator drawing
/2/	INSTALLATION MANUAL FOR ROTAX ENGINE TYPE 912 SERIES	
/3/	TOM-TC-01-DDP-9005.A	Fire sleeves
/4/	TOM-TC-01-DDP-4003.C	Fuel, Oil and Coolant hoses
/5/	TOM-TC-01-DDP-4009.A	Gascolator
/6/	TOM-TC-01-DDP-4010.B	Electric fuel pump
/7/	TOM-TC-01-DDP-4014.C	Water thermostat
/8/	TOM-TC-01-DDP-4015.A	Oil thermostat
/9/	TOM-TC-01-DDP-4016.A	Air filter
/10/	TOM-TC-01-DDP-4017.A	Hot air hose
/11/	TOM-TC-01-DDP-4018.A	Drain fuel hose
/12/	TOM-TC-01-DDP-4019.A	Cold air hose
/13/	TOM-TC-01-DDP-8013.B	Airbox filter holder
/14/	TOM-TC-01-DDP-8014.B	Airbox chamber
/15/	TOM-TC-01-DDP-8015.B	Airbox cold air intake
/16/	TOM-TC-01-DDP-8016.A	Airbox warm air intake
/17/	TOM-TC-15-DDP-8017.A	Cylinder cooling air baffle P
/18/	TOM-TC-14-DDP-4028.A	Screw connection set bent
/19/	TOM-TC-14-DDP-4029.A	Banjo fitting AN8
/20/	TOM-TC-14-DDP-4030.A	Banjo bolt
/21/	TOM-TC-14-DDP-4031.A	Push lock fitting AN8

Contents

1 General

The purpose of this document is to define and describe the overall installation of ROTAX 912S series engine with the external alternator to the Viper SD-4 RTC Night VFR airplane. It further describes the means of how the powerplant installation is attached to each other. This includes definition of cable/hose/Bowden/wire attachments and spots of those attachments. Spots are shown on representative Figures.

This document is based on the TOM-TC-01-C1-010 Powerplant installation document for Viper SD-4 RTC. The main differences between the Viper SD-4 RTC Night VFR and Viper SD-4 RTC are mentioned in Tab.1:

Table 1 Main differences between TOM-TC-01-C1-010 and TOM-TC-15-C1-010

Items added in TOM-TC-15-C1-010	Appereance
installation of ROTAX 912S series (912ULS is not allowed in Viper SD-4 RTC Night VFR)	Chapter 1 - General
powerplant installation drawing update	Fig.15
installation photos and description update	Tab. 6; Fig.3 - Fig.14
external alternator addition	Tab.6, pos.37; Fig.3
exhaust muffler joints change	Tab.6, pos.36; Fig.3
oil cooler fittings change	Tab.6, pos.10,12; Fig.8
cylinder cooling air baffle change	Tab.6, pos.33; Fig.3
oil fitting change	Tab.6, pos.11; Fig.8
vacuum fuel pump draining pipe lining change	Tab.6, pos.22; Fig.8

2 Bundling definition

The bundling used to fix single powerplant installation is defined in Table 2. Tie-wraps are used to bundle the oil, fuel, coolant hoses, Bowdens and electricity wires. When the Bowden cables that operates airbox conduit flaps, cold air intake conduit flap, carburettors, are set to their position a 0.5mm thick stainless safety wire is used at their ends to secure them from unintended rotation. A 0.8 mm stainless safety wire is used to secure exhaust tubes joints, magnetic plug, external alternator attachment, oil system, airbox and gascolator.

Table 2 Bundling types

Bundling	Type	Part No.
Plastic locking tie-wrap	PLT1.5I-M69	8000-0161
	PLT2I-M69	8000-0022
	PLT1M-M69	8000-0010
Stainless safety wire	ø0,5 mm	1800-0082
	ø0,8 mm	1800-0080

2.1 Tie-wraps

Figure 1: Tie-wrap

Manufacturer:

PANDUIT
United States
18900 Panduit Drive
Tinley Park, IL 60487

Supplier of tie-wraps:

SVK Elektronik s.r.o.
Slavětínská 142
190 14 Praha 9 Klánovice

Table 3 PLT1.5I-M69 locking tie definition (8000-0161)

Material	Flame Retardant Nylon 6.6
Color	Ivory
Cross Section	Intermediate
Locking Style	Locking
Min. Loop Tensile Strength Lbs. (N)	40 (178)
Continuous Use Temperature Range	-76° (-60°) - 212° (100°)
Plenum-Rated	No
Tool	GTS, GTSL, GS2B, PTS, PPTS, STS2
Length In (mm)	5.6 (142)
Thickness In (mm)	0.044 (1.1)
Bundle Diameter Range In. (mm)	0.06 (1.5) - 1.38 (35)
CE Compliant	Yes
CSA Certified	Yes
UL 62275 Compliant (Type 1, 11)	Yes
UL Listed (File #E56854)	No
UL Recognized (File #E56854)	Yes
Application	General
Installation Temperature	-4°F (-20°C) - 32°F (0°C)
Operating Temperature	-76°F (-60°C) - 212°F (100°C)
Part Features	One-piece locking wedge for consistent performance and reliability. Low thread force and high loop tensile strength.
Thickness (mm)	1.1
UV Resistant	No
Width In (mm)	0.142 (3.6)
RoHS Compliancy Status	Compliant

Table 4 PLT2I-M69 locking tie definition (8000-0022)

Material	Flame Retardant Nylon 6.6
Color	Ivory
Cross Section	Intermediate
Length (In.)	8.0
Length (mm)	203
Locking Style	Locking
Width (In.)	0.142
Width (mm)	3.6
Min. Loop Tensile Strength Lbs. (N)	40 (178)
Continuous Use Temperature Range	-76° (-60°) - 212° (100°)
Plenum-Rated	No
Tool	GTS, GTSL, GS2B, PTS, PPTS, STS2
Length In (mm)	8.0 (203)
Thickness In (mm)	0.045 (1.1)
Bundle Diameter Range In. (mm)	0.06 (1.5) - 2.00 (51)
CE Compliant	Yes
CSA Certified	Yes
UL 62275 Compliant (Type 1, 11)	Yes
UL Listed (File #E56854)	No
UL Recognized (File #E56854)	Yes
Installation Temperature	-4°F (-20°C) - 32°F (0°C)
Operating Temperature	-76°F (-60°C) - 212°F (100°C)
Part Features	One-piece locking wedge for consistent performance and reliability. Low thread force and high loop tensile strength.
RoHS Compliancy Status	Compliant

Table 5 PLT1M-M69 locking tie definition (8000-0010)

Material	Flame Retardant Nylon 6.6
Color	Ivory
Cross Section	Miniature
Length (In.)	3.9
Length (mm)	99
Locking Style	Locking
Width (In.)	0.098
Width (mm)	2.5
Min. Loop Tensile Strength Lbs. (N)	18 (80)
Continuous Use Temperature Range	-76° (-60°) - 212° (100°)
Plenum-Rated	No
Tool	GTS, GTSL, GS2B, PTS, PPTS, STS2
Length In (mm)	3.9 (99)
Thickness In (mm)	0.043 (1.1)
Bundle Diameter Range In. (mm)	0.06 (1.5) - 0.87 (22)
CE Compliant	Yes
CSA Certified	Yes
Mil. Std. Part Number	—
UL 62275 Compliant (Type 1, 11)	Yes
UL 62275 Compliant (Type 2, 21)	—
UL Listed (File #E56854)	No
UL Recognized (File #E56854)	Yes
Installation Temperature	-4°F (-20°C) - 32°F (0°C)
Operating Temperature	-76°F (-60°C) - 212°F (100°C)
Part Features	One-piece locking wedge for consistent performance and reliability. Low thread force and high loop tensile strength.
RoHS Compliancy Status	Compliant

2.2 Safety wire

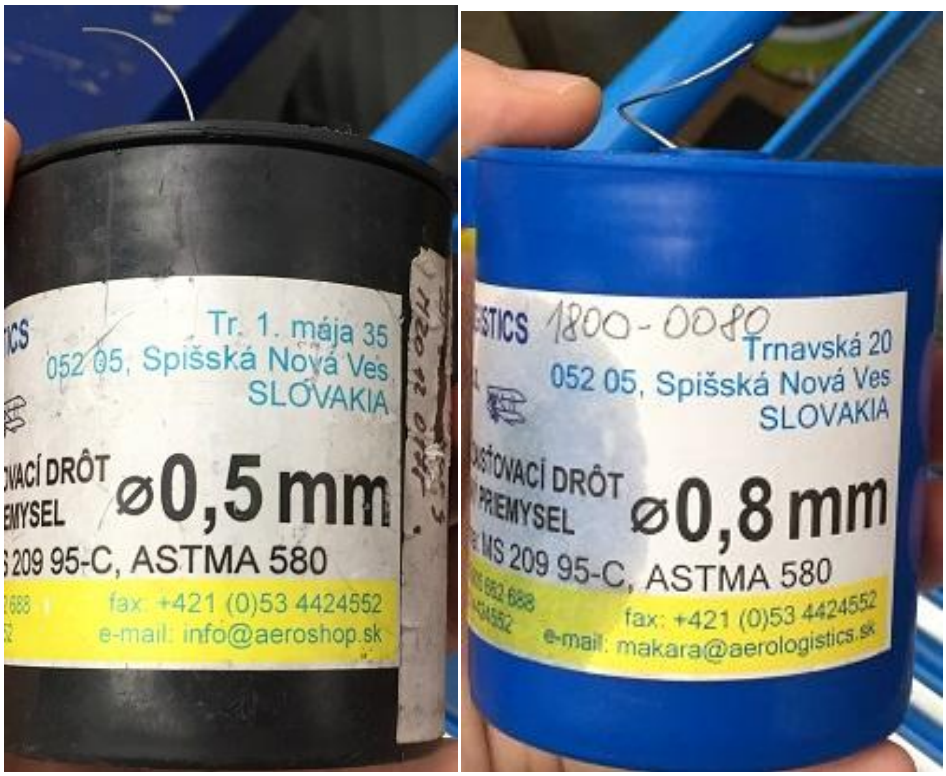


Figure 2: Stainless safety wire

Manufacturer:

AERO LOGISTICS s.r.o.
Trieda 1. mája 35
052 05, Spišská Nová Ves
Slovakia

Meeting regulation: MS 209 95-C and ASTMA 580

3 Powerplant installation

For ROTAX 912S series with the external alternator to the Viper SD-4 Night VFR fuselage installation please refer to actual drawing No. SD4-B-6-001-N-1 and to TOM-TC-01-SM-08 Bolted joints actual procedure. This document serves to provide a clearer picture of how the powerplant hoses and wires should be guided and attached by different means.

4 Spots

This chapter defines which powerplant installation system is attached to which installation. Figures are used to define the bundling position. Table 6 serves as guidance for attached Figures to help to define each line and attachment.

Table 6: Description of powerplant installation

Pos.	Description
1	fuel line from gascolator to fuel vacuum pump /4/
2	oil line from engine to oil reservoir /4/
3	fuel line to fuel pressure sensor /4/
4	fuel restrictor line /4/
5	fuel line from fuel flow sensor to carburettors /4/
6	draining of carburettor float chamber to airbox
7	oil line from oil reservoir to oil thermometer /4/
8	carburettor suction compensation line
9	coolant expansion reservoir draining line
10	oil line from oil cooler to oil thermometer /4//19//20//21/
11	oil line from oil thermometer to oil pump /4//18/
12	oil line from oil thermometer to oil cooler /4//19//20//21/
13	fuel line from fuel vacuum pump to fuel pressure and fuel flow sensors and to restrictor line
14	oil reservoir draining line
15	fuel line bypass /4//6/
16	warm heating air distribution line /10/
17	fuel line to LHS carburettor /4/
18	fuel line to RHS carburettor /4/
19	drip tray and airbox draining line
20	fuel line from fuselage to gascolator /4/
21	coolant from cooler to engine (thermostat) /4/
22	vacuum fuel pump draining line /11/
23	left and right choke bowden cable
24	left and right throttle bowden cable
25	left and right heating flap bowden cable
26	airbox bowden cable
27	cylinder cooling air baffle bowden cable

Pos.	Description
28	cooling from cylinder head to thermostat /4/
29	cylinder head coolant reservoir
30	manifold pressure sensor line /4/
31	airbox /13//14/
32	airbox air filter /9/
33	cylinder cooling air baffle /17/
34	airbox cold air intake line /15/
35	airbox warm air intake line /16/
36	exhaust tubes joint connection (spring type secured with safety wire)
37	external alternator with pulley
38	coolant thermostat /7/
39	oil thermostat /8/
40	fuel flow sensor
41	fuel pressure sensor
42	oil cooler
43	water cooler
44	coolant from thermostat to cooler /4/

4.1 Powerplant installation

As seen on the next figures most of the fuel, oil, coolant and draining lines and Bowden cables are attached by plastic locking tie-wraps.
Fuel and oil lines are covered by orange fire-proof sleeves /3/ ended up with fire-proof sealing tape.

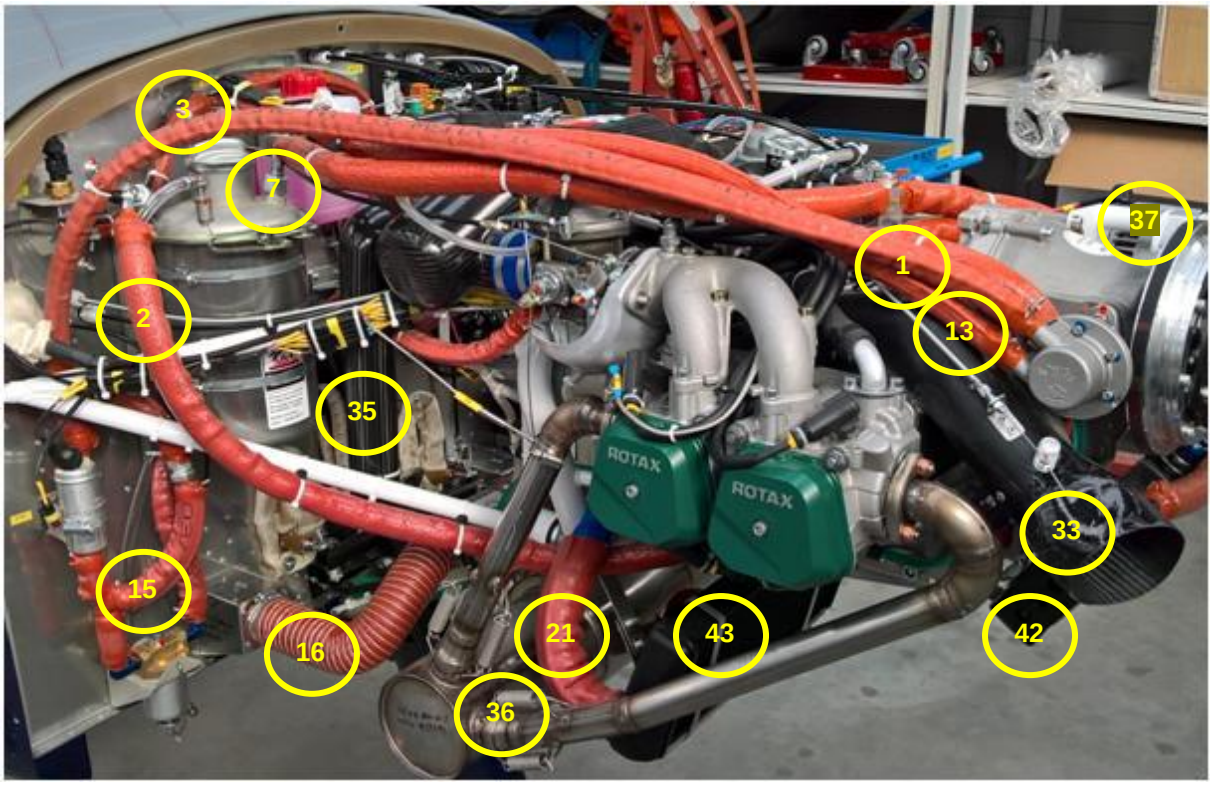


Figure 3: Viper SD-4 RTC Night VFR Powerplant installation

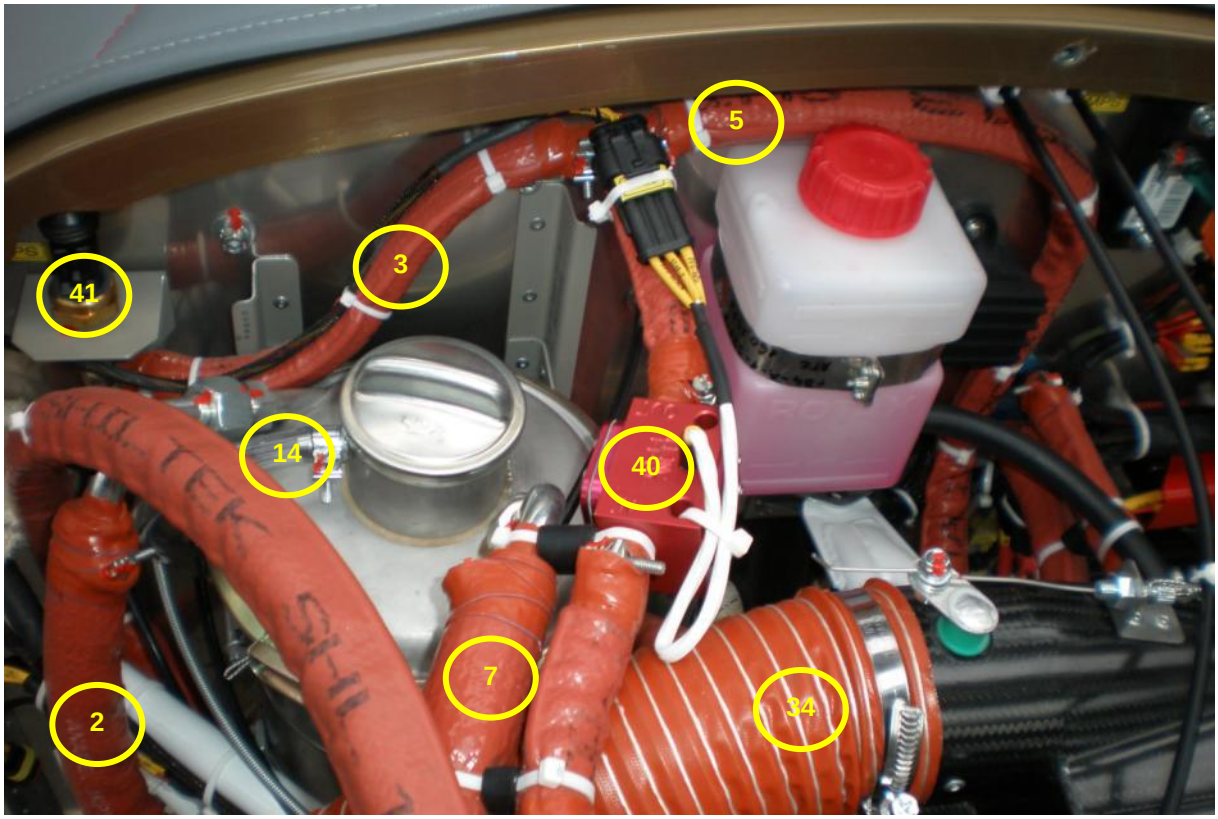


Figure 4: Viper SD-4 RTC Night VFR Powerplant installation

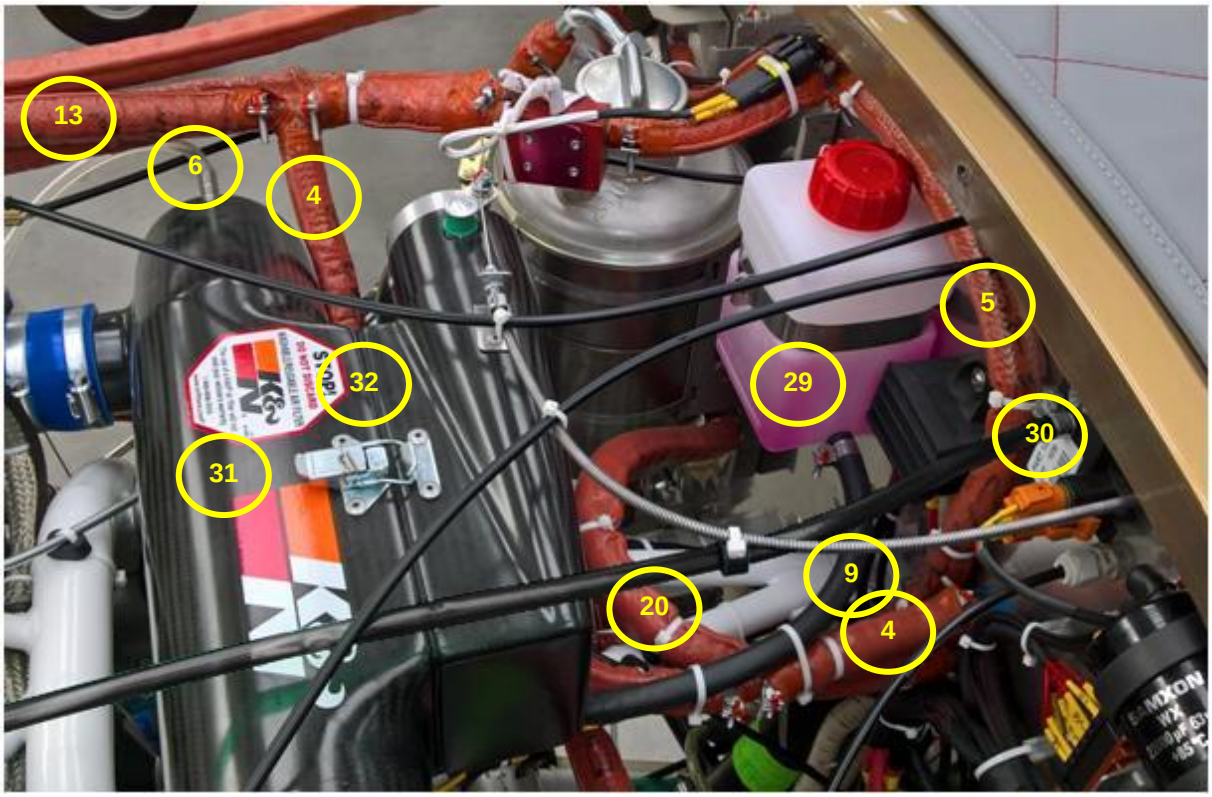


Figure 5: Viper SD-4 RTC Night VFR Powerplant installation

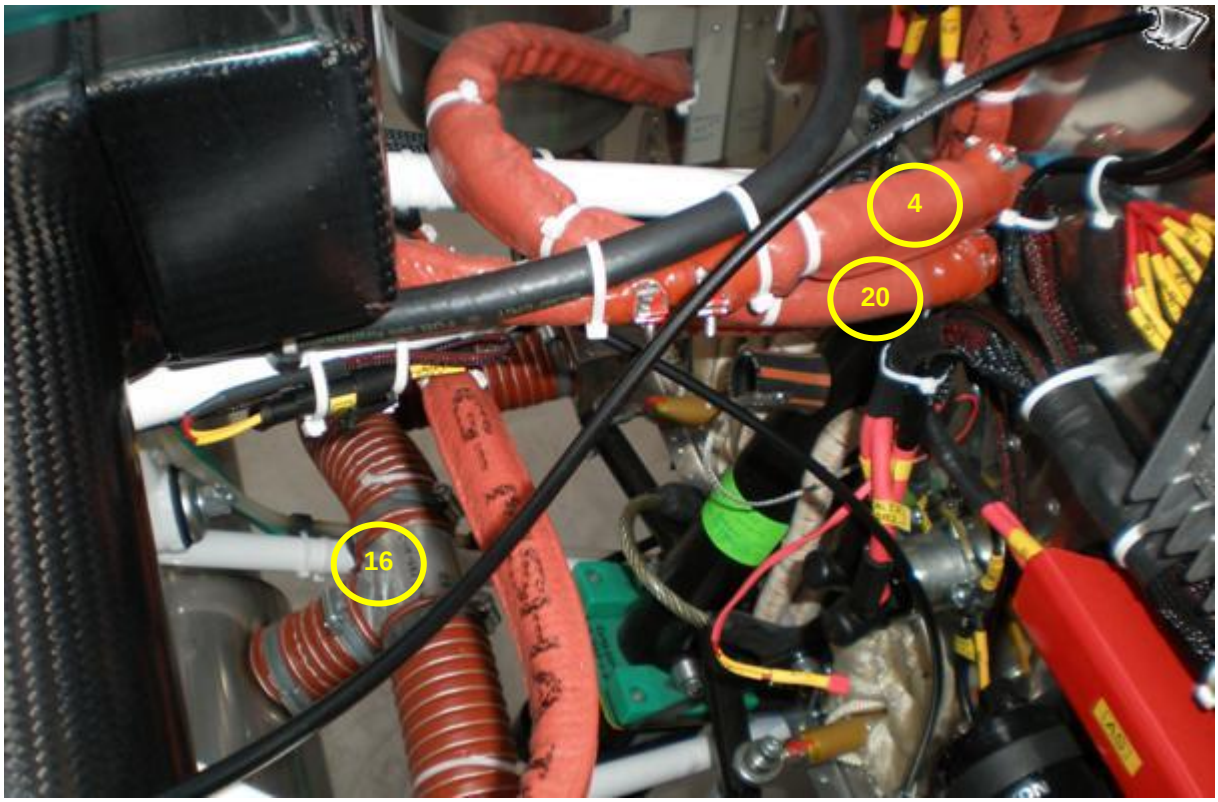


Figure 6: SD-4 RTC Night VFR Powerplant installation

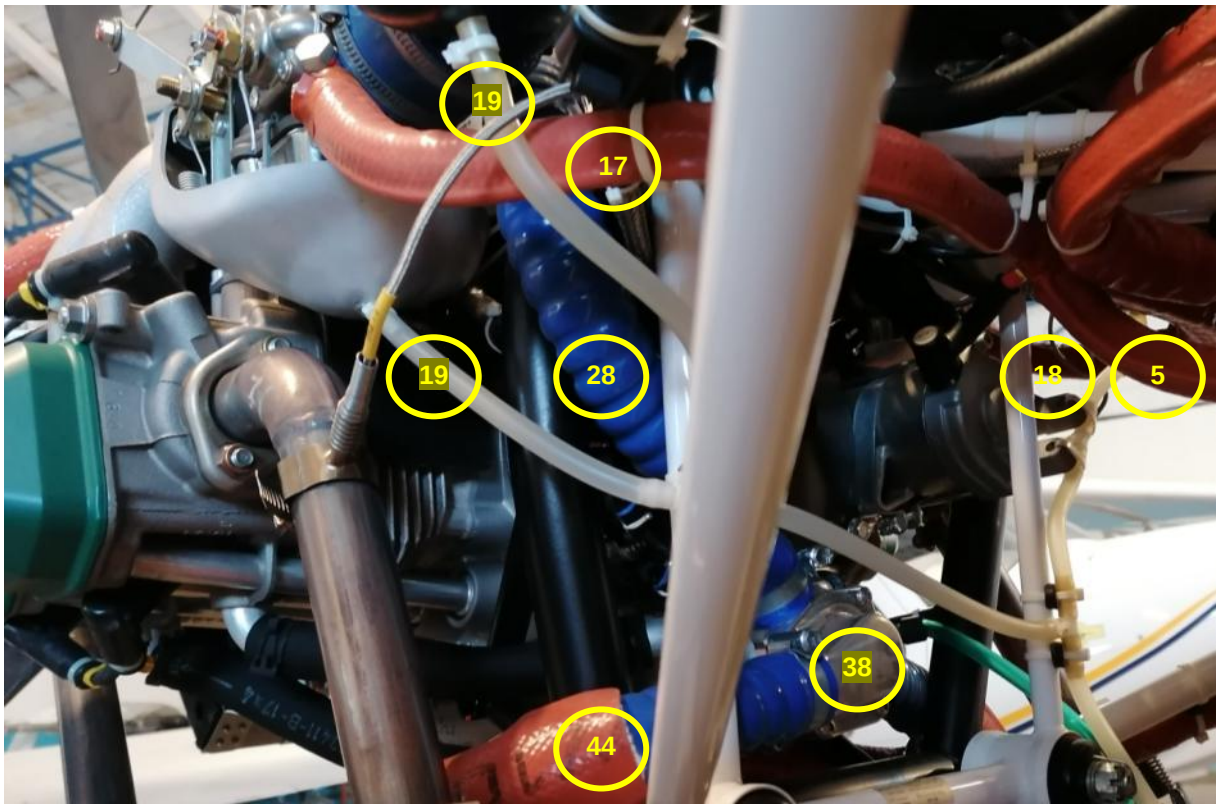


Figure 7: SD-4 RTC Night VFR Powerplant installation

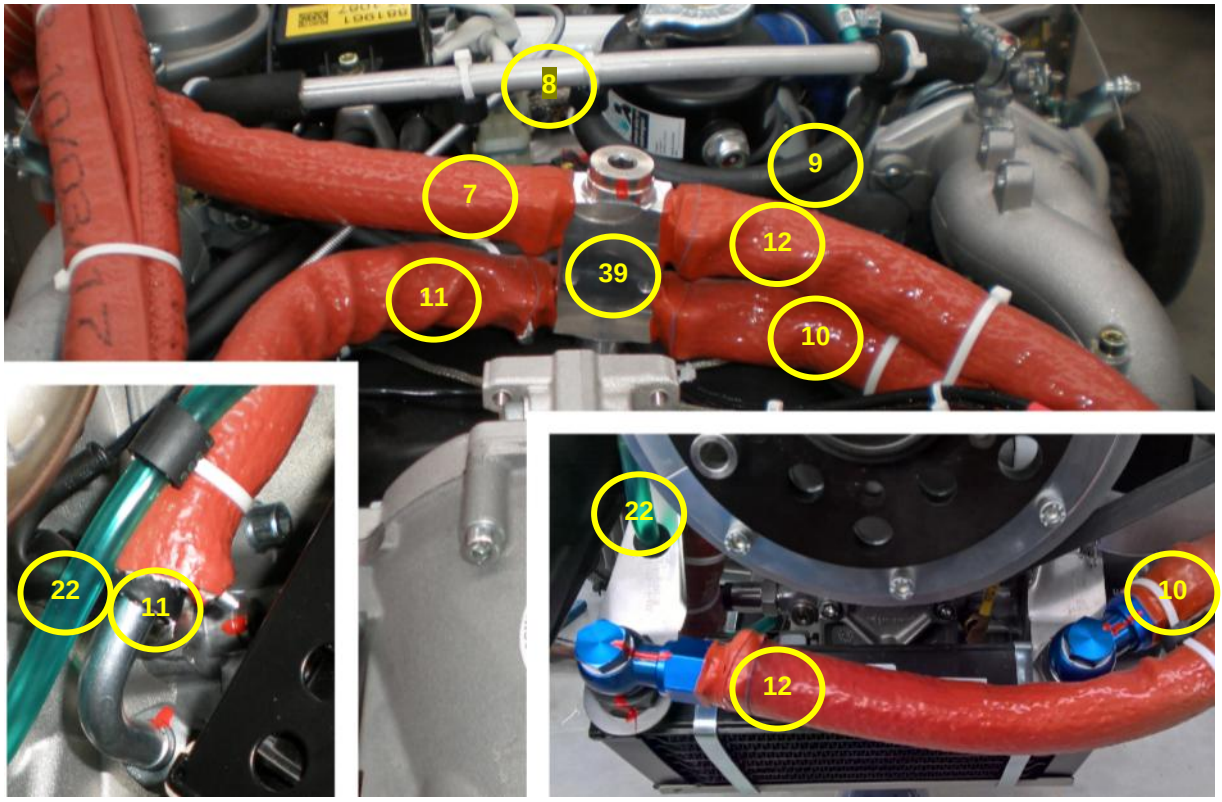


Figure 8: SD-4 RTC Night VFR Powerplant installation

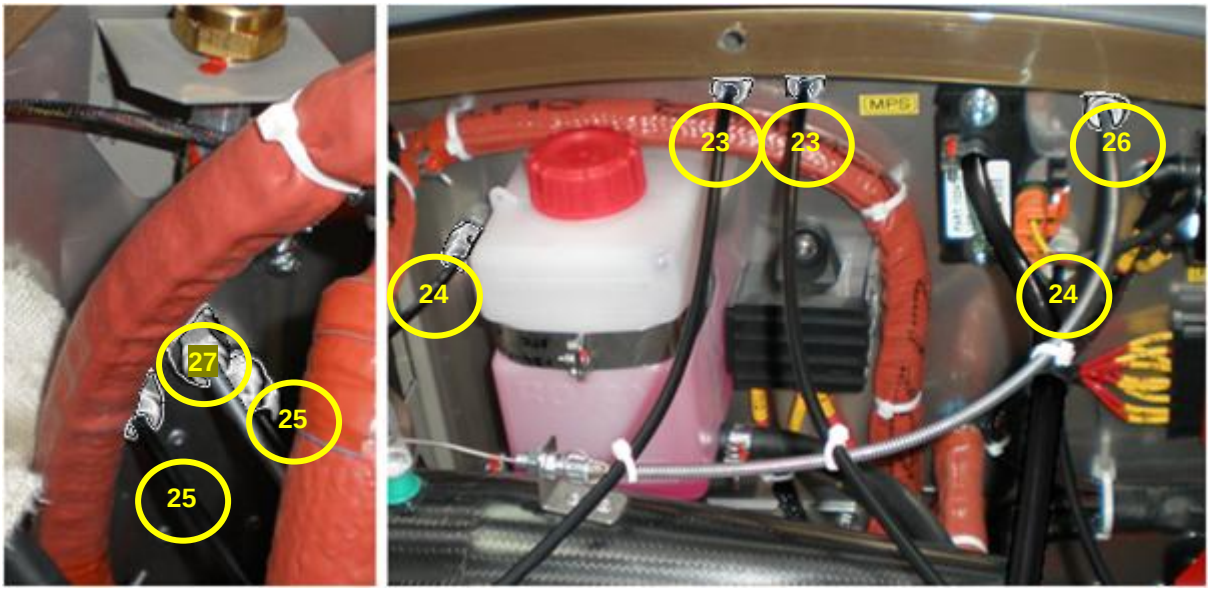


Figure 9: SD-4 RTC Night VFR Bowden cables installation

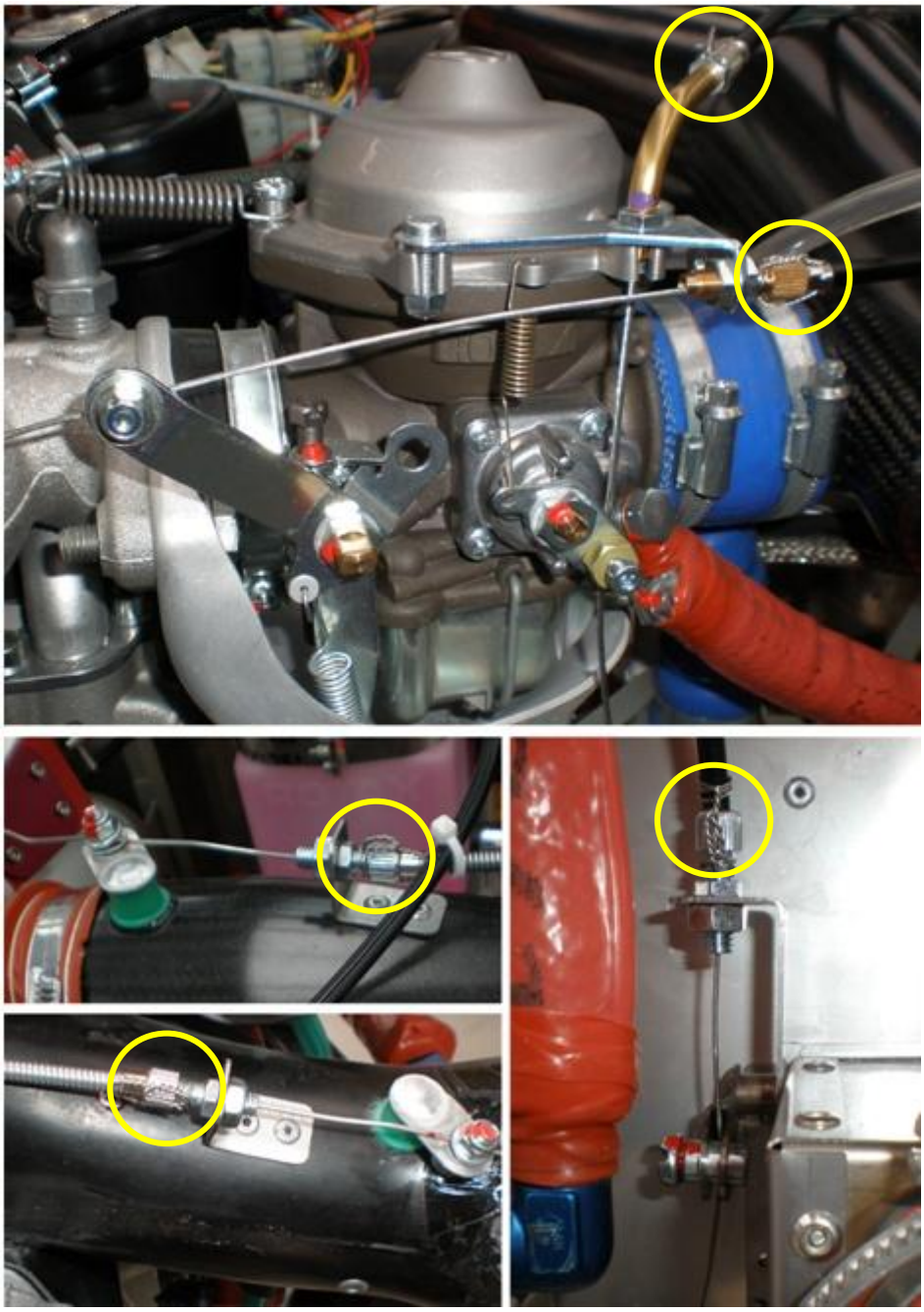


Figure 10: Stainless safety wire 0,5mm application – Bowden cable ends

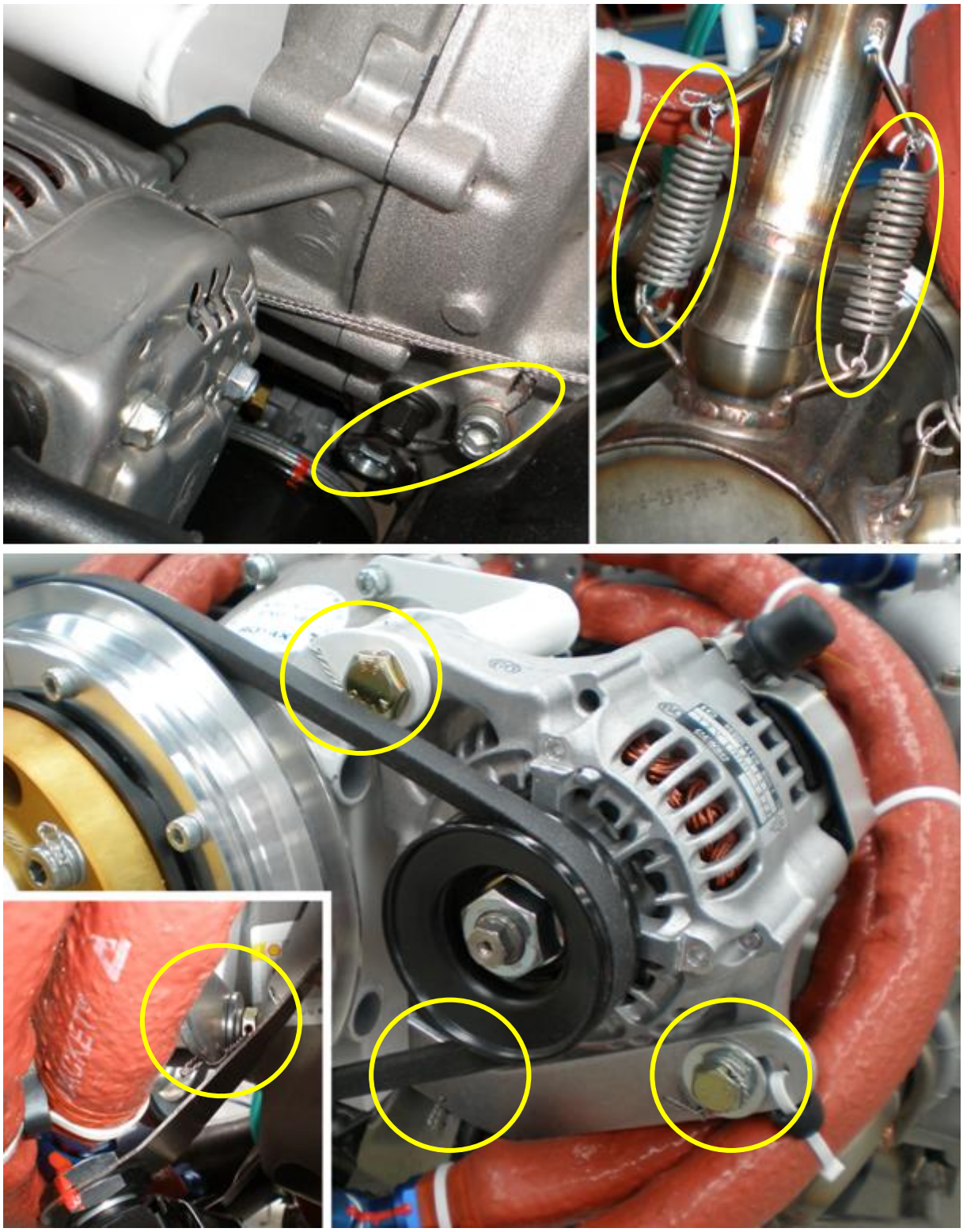


Figure 11: Stainless safety wire 0,8mm application - magnetic plug, exhaust joint springs, external alternator attachment

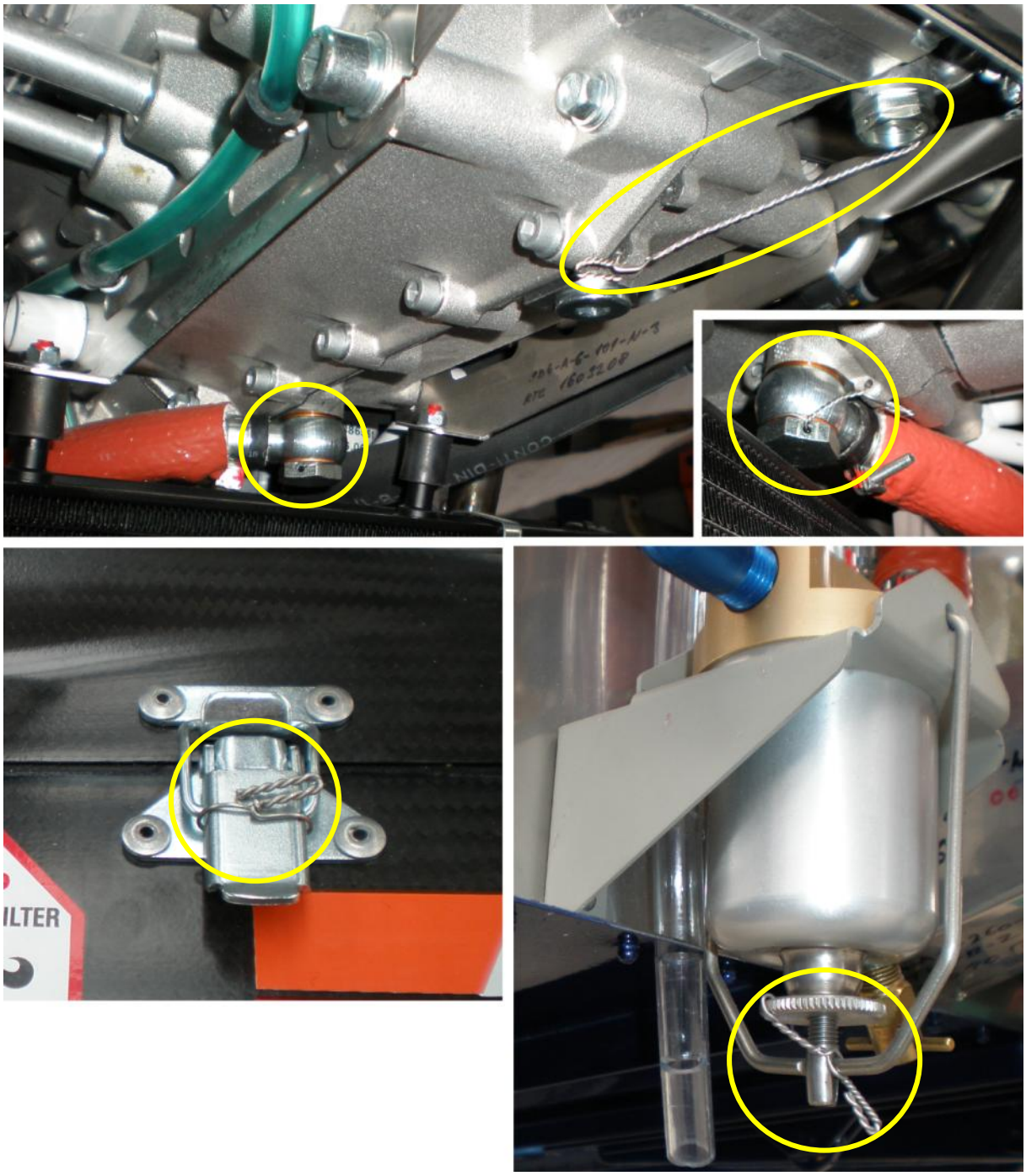


Figure 12: Stainless safety wire 0,8mm application – oil system, airbox, gascolator

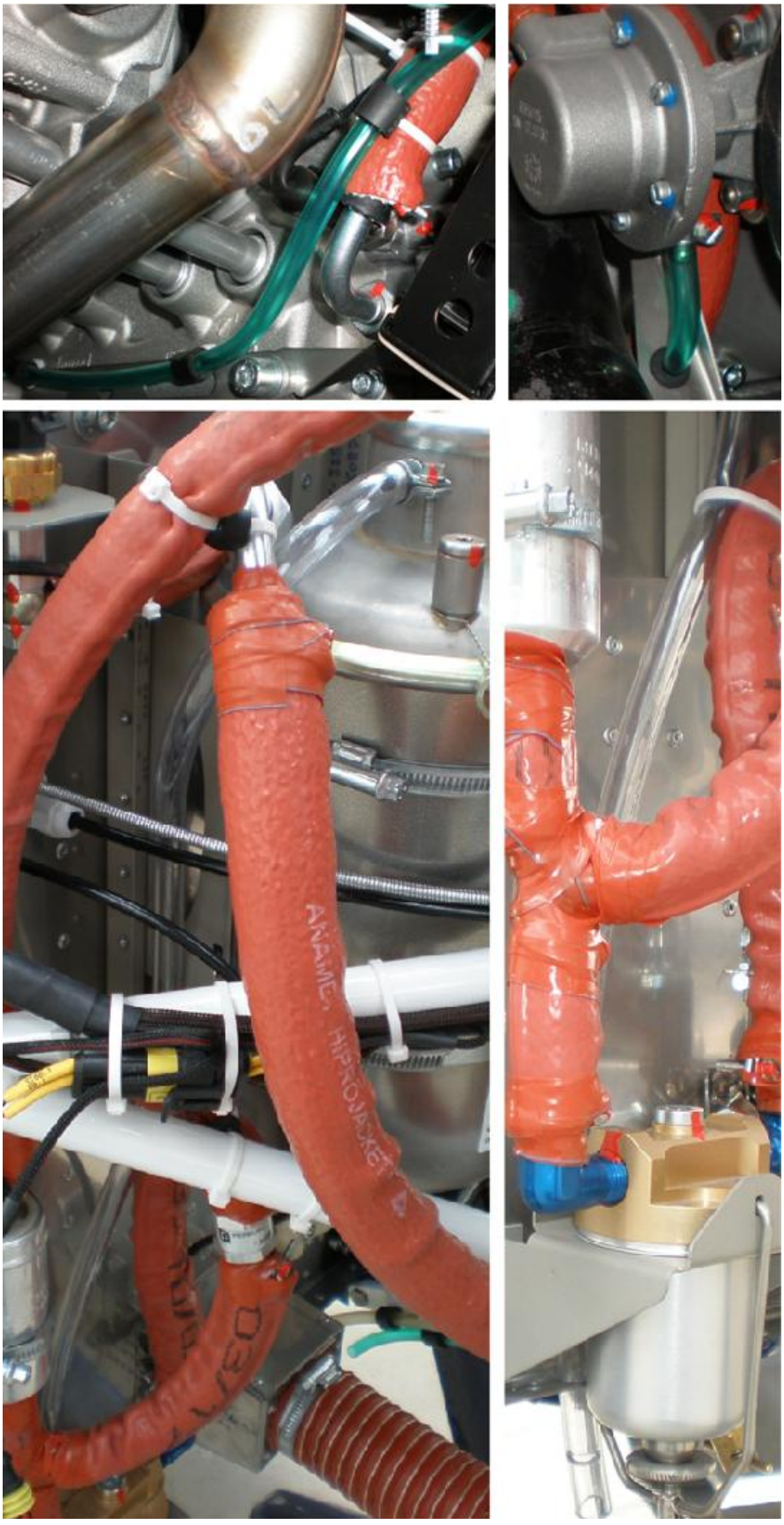


Figure 13: Draining lines - fuel vacuum pump, oil reservoir

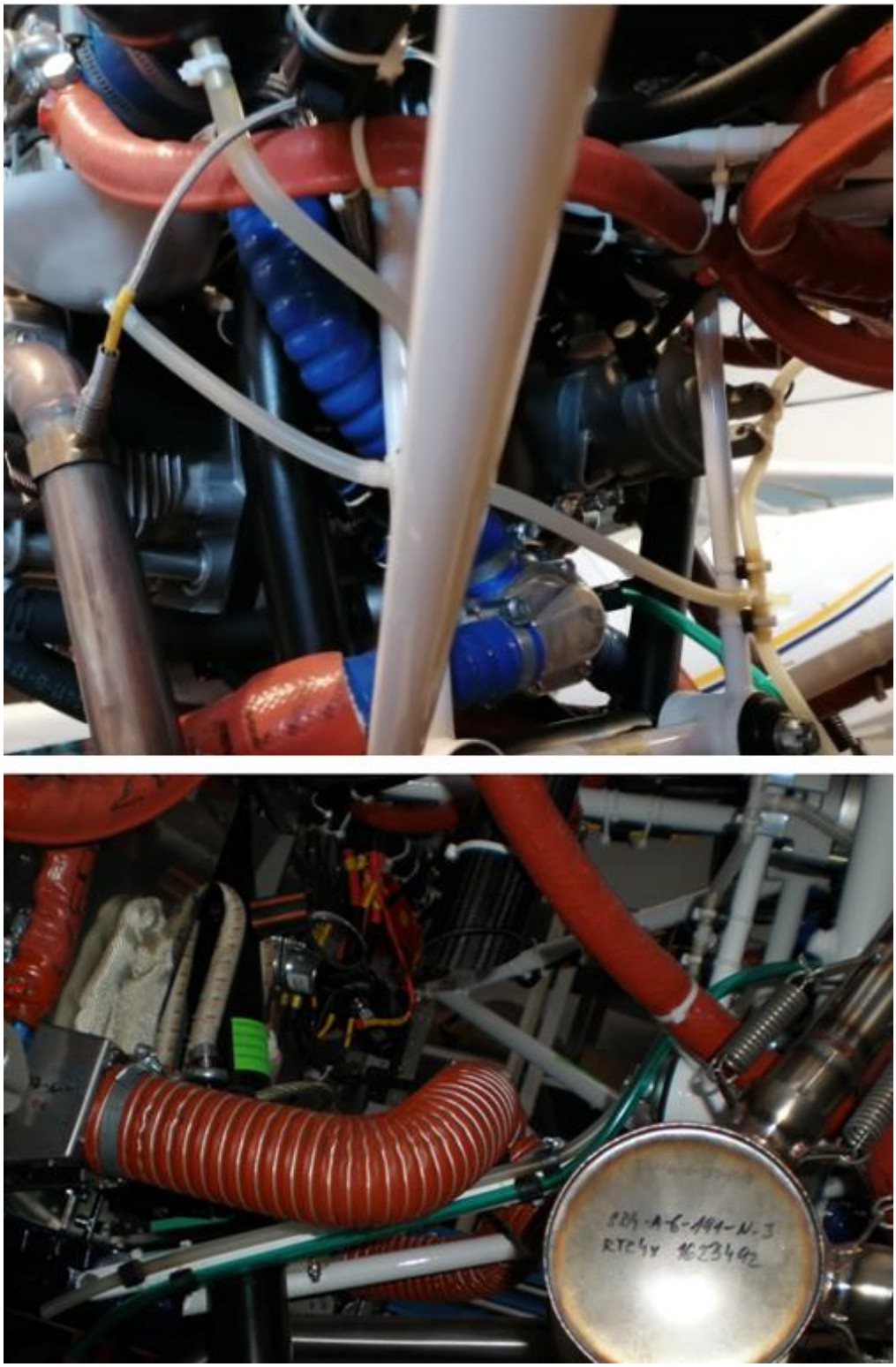


Figure 14: Draining lines - drip tray, airbox, fuel vacuum pump

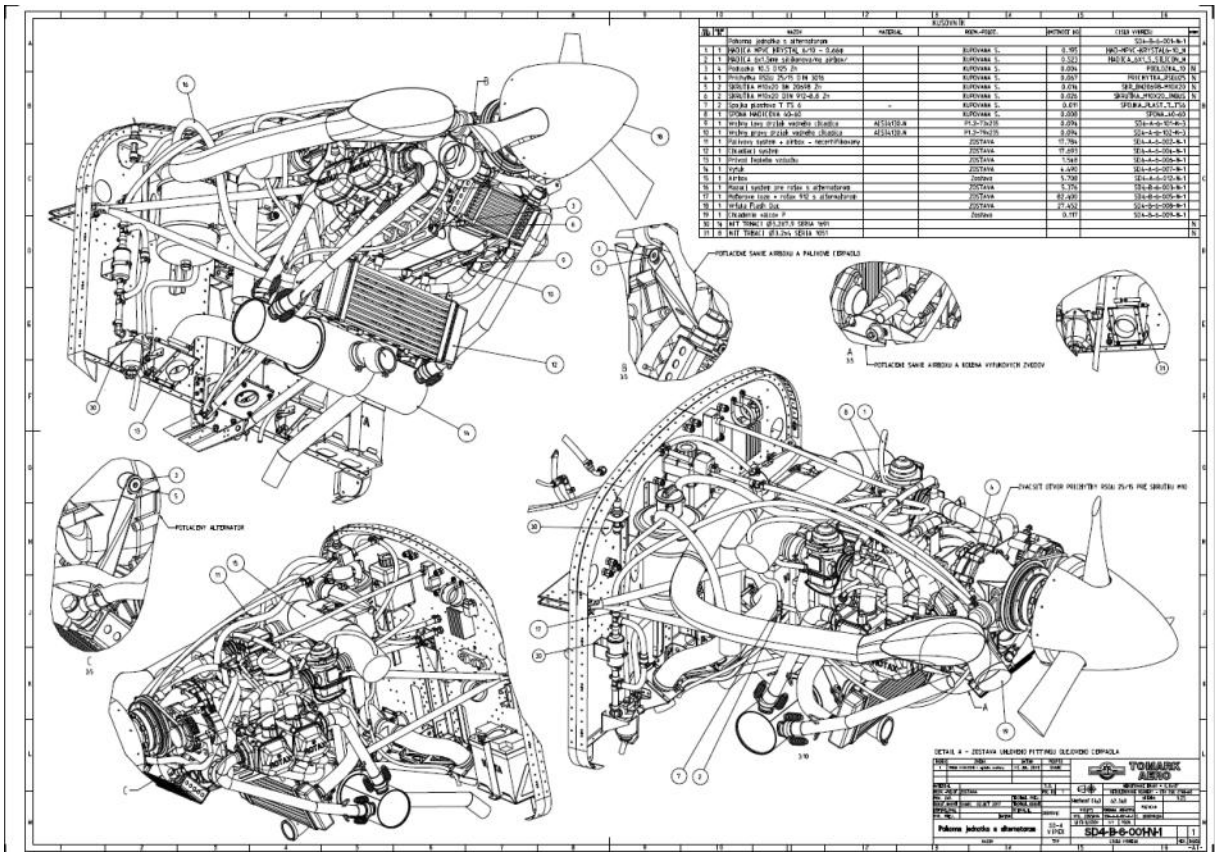


Figure 15: SD4-B-6-001-N-1#1 Powerplant unit with external alternator /1/