

ARS-ALTMANN



OIL FILTER UNIT S-03 for continuous on-load filtration of tap-changers of main transformers

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1. Introduction

The continuous filtration of tap-changers of power (main) transformers is generally focussed on the reduction of the internal contamination of its oil inventory caused by :

- particles
- moisture

When an on-load tap-changer works under load the dirt is always internally generated causing an increase in mechanical wear and a reduction of the dielectric strength of the oil as a consequence.

The another very unpleasant decrease of the dielectric strength of a switching oil is simultaneously caused by the moisture, because two potential sources of the water in the tap-changer always exist :

- internal - as a by-product of the arc-induced decomposition of the oil.
- external – due leaking of the air filter or conservator

The S-03 filtration unit was developed to handle a very new problem of recent versions of tap-changers built from non-hygroscopic (hydrofobic) insulants.

Hydrofobic insulants, on the contrary to the previously used hygroscopic materials (as e.g. boards) of „old“ tap-changers, do not have any „buffer capacity“ to the water - they are not able to bind the water from the oil.

Therefore any little amount of the water which enters into the oil inventory of a modern „hydrofobic“ tap-changer immediately increases the relative humidity and decreases the dielectric strength of the oil.

Users of „hydrofobic“ tap-changers are therefore exposed to a new and very uncomfortable operational reality.

While old „hygroscopic“ tap-changers were able to withstands the slight water contamination for relatively long time without the critical loss of the dielectric strength, the dielectric behaviour of modern tap-changers is very sensitive to any water input and the user is therefore forced to continuously remove the water and/or a dirt from his tap-changer to prevent the decrease of the dielectric strength of the oil.

The S-03 filtration unit, working continuously, satisfies both requirements by means of the external collection of the undesired substances.

The large-volume of the pre-dried cellulose insert simultaneously **binds the water and dirt particles** for relatively long time without negative impacts on the reliability of a tap-changer.

Basic advantages of the S-03 filter unit: :

- the long-term preservation of the required dielectric strength of the oil
- the reduction of the wear of mechanical parts
- the reduction of costs due to prolonging of maintenance time-intervals
- the strong reduction of the number of oil replacements = cost reduction
- easy change of the filter insert under normal operational conditions.

2. Technical specification

Motor:	Type :3-phase, squirrel-cage (or on demand)
	Power: 0.18 kW
	Voltage: 3x400V, 50Hz (60Hz) (or on demand)
	Speed: 1350 1/min.
	Protection class : IP65 (fully hermetized)
Oil pump:	Gear pump (Monobloc version)
	Hydraulic power : 250 l/hour
Safety valve	Adjustable: 3b
Filter insert	Type : B-005-OK-250BP (dia 150)
	Materiál: Cellulose (pre-dried at 0.2 % mass weight)
	Filtering grade: 3 µm
	Typical pressure drop at 20C:
	New insert : < 2 bar (3 bar)
	Max. storage time : 12 months, with undamaged package
Pressure / flow reading	Gauge (-100, 300 kPa)
Noise	< 65 dB(A)
Weight (without oil)	34 kg
Connection	Hose 3/8" , hard tubing 3/8"
Surface protection	all-stainless

3. Installation

The schematical lay-out of the installation of the S-03 filter unit on a tap-changer is shown at Fig.1 .

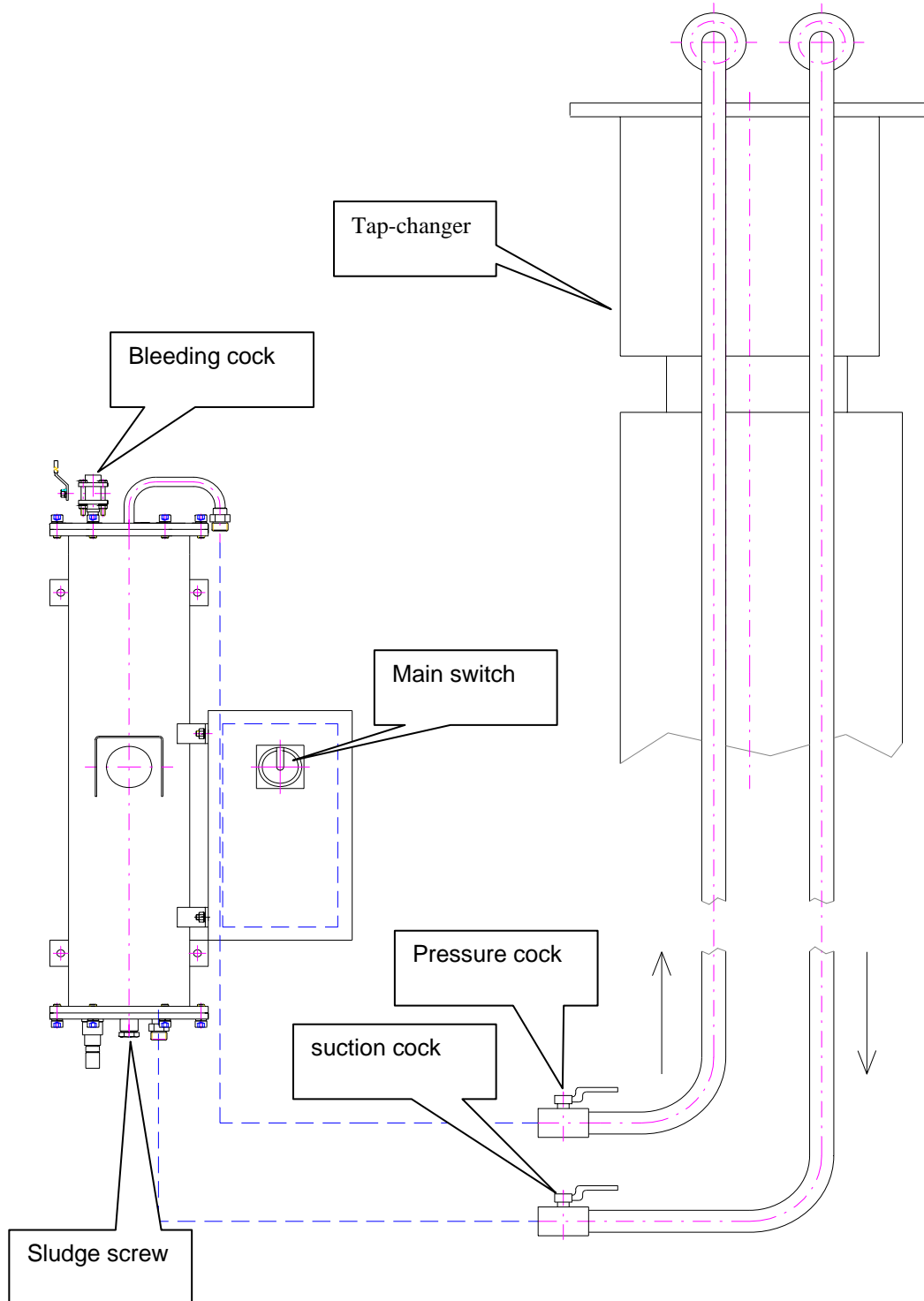


Fig. 1. The schematical lay-out of the installation

The S-03 filter unit is usually fixed directly onto the main tank of a transformer.

The hydraulical interconnection between the tap-changer and the S-03 unit is performed by 3/8" hoses or 3/8" seamless tubes.

For the detailed description of the installation , power supply and the replacement of the filtration insert See: www.ars-altmann.com/News/Manuals.

4. Structure and function of the S-03 filter unit

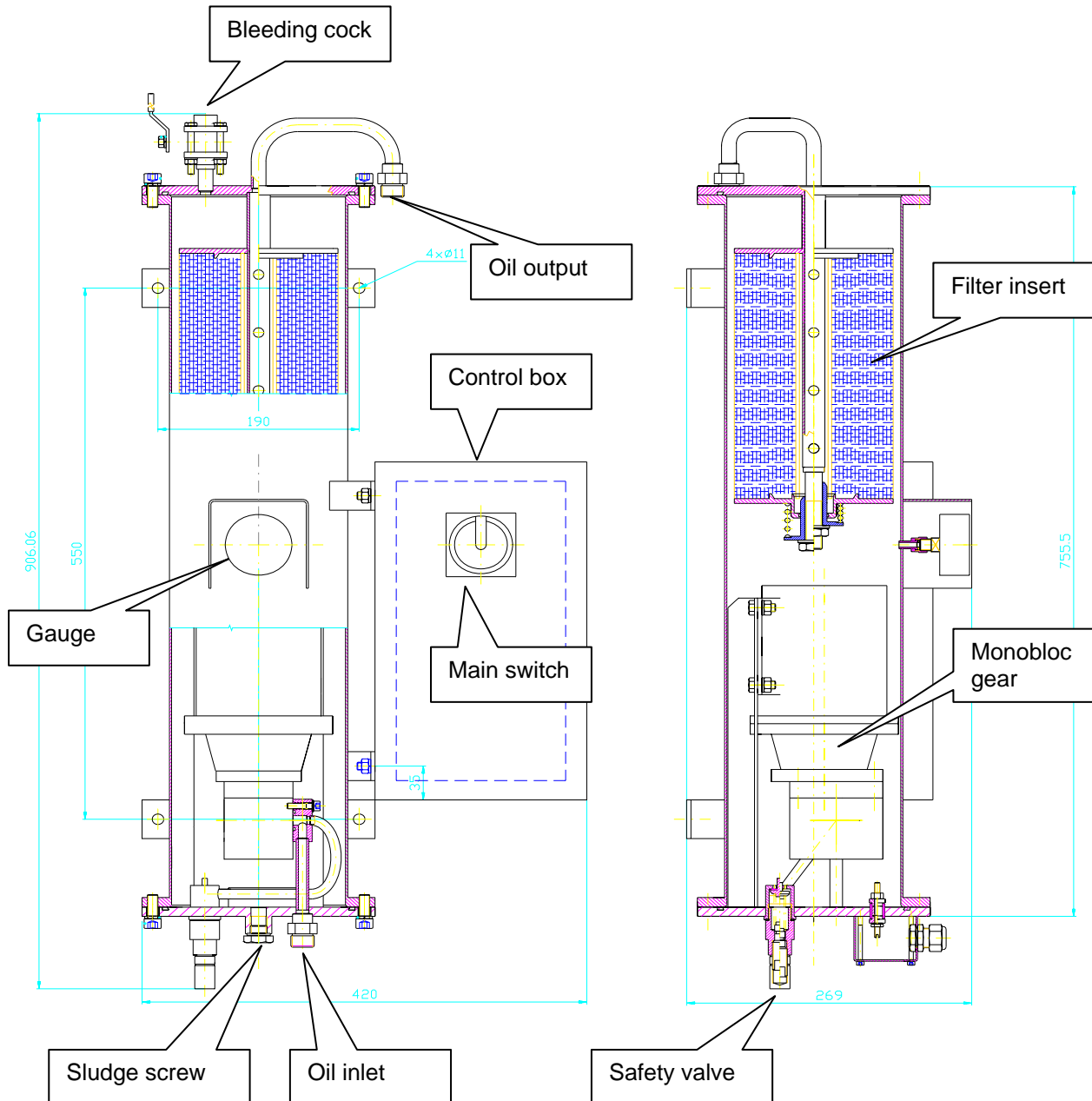


Fig. 2 Internal structure of the S-03 unit

The contaminated oil from the bottom of the tap-changer is fed into the S-03 unit by the inlet screw coupling and forced by the monobloc gear pump into the vessel where the special large-volume cellulose filter insert is situated.

The water and particles are removed from the oil due the radial flow of the oil through the filter insert, and captured in/on cellulose fibres. The clean oil leaves the S-03 via outlet screw connection and flows back into the upper part of the tap-changer.

The replacement of the saturated filter insert is very simple and can be performed under normal operational condition of a transformer.

For a detailed description of the filter insert See S-03 Manual.

An example of the standard application – the triple S-03 system - the three S-03 filter units on the common frame for the simultaneous filtration of three tap-changers of the 60 MVA main transformer.



The hydraulic circuits are performed by pressure hoses with a minimal intervention into the existing oil system of tap-changers. Every tap-changer has here its own S-03 filtration unit.

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