



TRAFO ELETTRIO srl  
 VIA PONTE POSCOLA, 36075 MONTECCHIO MAGGIORE (VI)  
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Mod. M74  
 Rev 3

**Test report IEC 60076 / EU-548/2014**

**Type:** Oil      **Serial no.:** 11985      **Phase:** 3      **Order no.:** OV21-0421  
**Voltage:** 22 + 2 - 4 x 2,5% - 11 + 2 - 4 x 2,5% / 0,      **Frequency:** 50 Hz      **Vector group:** Dyn 11 - Dyn 11      **Customer no.:** C01066  
**Current:** 32,8 - 65,61 / 1739,01 A      **Power:** 1250 kVA      **Model:** TES-ORR3-2      **Temp. Reference:** 75 °C  
**Cooling:** KNAN      **Temperature:** 15,1 °C

**Primary windings material:** Aluminium      **Secondary windings material:** Aluminium

| Turn ratio   |         | Secondary windings material: Aluminium |               |               | Nominal |           |
|--------------|---------|--|---------------|---------------|---------|-----------|
| Tap changer  | Voltage | 1U-1V / 2u-2n                          | 1V-1W / 2v-2n | 1W-1U / 2w-2n | ratio   | Deviation |
| 1            | 23100   | 96,60                                  | 96,59         | 96,59         | 96,41   | 0,19%     |
| 2            | 22550   | 94,27                                  | 94,27         | 94,29         | 94,12   | 0,19%     |
| 3            | 22000   | 91,95                                  | 91,95         | 91,95         | 91,82   | 0,14%     |
| 4            | 21450   | 89,64                                  | 89,65         | 89,65         | 89,52   | 0,14%     |
| 5            | 20900   | 87,31                                  | 87,31         | 87,31         | 87,23   | 0,09%     |
| 6            | 20350   | 85,00                                  | 85,00         | 85,02         | 84,93   | 0,10%     |
| 7            | 19800   | 82,68                                  | 82,68         | 82,68         | 82,64   | 0,05%     |
| 1            | 11550   | 48,28                                  | 48,28         | 48,28         | 48,21   | 0,16%     |
| 2            | 11275   | 47,13                                  | 47,13         | 47,13         | 47,06   | 0,16%     |
| 3            | 11000   | 45,97                                  | 45,97         | 45,97         | 45,91   | 0,13%     |
| 4            | 10725   | 44,81                                  | 44,81         | 44,81         | 44,76   | 0,11%     |
| 5            | 10450   | 43,65                                  | 43,65         | 43,65         | 43,61   | 0,09%     |
| 6            | 10175   | 42,50                                  | 42,50         | 42,50         | 42,47   | 0,07%     |
| 7            | 9900    | 41,34                                  | 41,34         | 41,34         | 41,32   | 0,06%     |
| Vector group |         | Dyn 11 - Dyn 11                        |               |               |         |           |

Instrument: Turn ratio meter cod. RAPSRO2      **Result:** Satisfactory

| Resistance measurement          |         |         | 1U-1V |  |  | 1V-1W                        |       |       | 1W-1U |  |  |
|---------------------------------|---------|---------|-------|--|--|------------------------------|-------|-------|-------|--|--|
| 2u-2v                           | 2v-2w   | 2w-2u   | μΩ    |  |  | Ω                            |       |       | Ω     |  |  |
| 706,350                         | 706,650 | 724,750 |       |  |  | 2,682                        | 2,680 | 2,694 |       |  |  |
| Rph LV = 356,292 μΩ/ph          |         |         |       |  |  | Rph HV = 4,028 Ω/ph          |       |       |       |  |  |
| Rph LV at 75 °C = 445,179 μΩ/ph |         |         |       |  |  | Rph HV at 75 °C = 5,033 Ω/ph |       |       |       |  |  |

Instrument: Winding resistance meter cod. RESSPRO2

| Insulation tests         |      |     |      |
|--------------------------|------|-----|------|
|                          | kV   | Hz  | Time |
| Induced overvoltage test | 0,83 | 200 | 30"  |
| Applied voltage test HV  | 50   | 50  | 60"  |
| Applied voltage test LV  | 3    | 50  | 60"  |

Instruments: 1 voltmeter cod. VOLSPR05 - 3 voltmeters cod. VOLSPR06/VOLSPR07/VOLSPR08      **Result:** Satisfactory

| No load test  |        |        |        |         |      |      |      |      |  |                 |
|---|--------|--------|--------|---------|------|------|------|------|--|-----------------|
| Supply from LV side 415 V : Equivalent voltage for test 415 V |        |        |        |         |      |      |      |      |  |                 |
|   |        |        |        |         |      |      |      |      |  | Frequency 50 Hz |
| Vu  | Vv     | Vw     | Vm     | V(rms)m | Iu   | Iv   | Iw   | Im   |  | Wtot            |
| 416,55  | 416,67 | 414,43 | 415,88 | 413,00  | 2,34 | 1,60 | 2,20 | 2,05 |  | 965,5           |

Instrument: digital wattmeter cod. WATSPR03

| Load test                            |         |         |         |  |                         |       |       |                                      |  |                 |  |
|--------------------------------------|---------|---------|---------|--|-------------------------|-------|-------|--------------------------------------|--|-----------------|--|
| Supply from HV side 22000 V          |         |         |         |  |                         |       |       |                                      |  |                 |  |
|                                      |         |         |         |  |                         |       |       |                                      |  | Frequency 50 Hz |  |
| Vu                                   | Vv      | Vw      | Vm      |  | Iu                      | Iv    | Iw    | Im                                   |  | Wtot            |  |
| 1296,70                              | 1294,50 | 1293,10 | 1294,77 |  | 32,77                   | 32,75 | 32,92 | 32,81                                |  | 8464,5          |  |
| Voltage at nominal current: 1294,4 V |         |         |         |  | Nominal current: 32,8 A |       |       | Losses at nominal current: 8459,69 W |  |                 |  |
| Ohmic losses: 9454,38 W              |         |         |         |  | Stray losses: 714,73 W  |       |       | Losses at 75 °C : 10169,11 W         |  |                 |  |

Instrument: digital wattmeter cod. WATSPR03

| Leak testing with pressure |      |
|----------------------------|------|
| kPa                        | Time |
| 30                         | 8h   |

No leakage detected on visual inspection      **Result:** Satisfactory

| Summary                         |            | Guaranteed | Measured | Tolerances                                 | Deviation |
|---------------------------------|------------|------------|----------|--|-----------|
| No load losses                  | (W)        | 980        | 965      | +0,0%                                      | -1,5%     |
| No load current                 | (%)        | 0,50       | 0,12     | +30,0%                                     | -76,5%    |
| Load losses at 75 °C            | (W)        | 10450      | 10169    | +0,0%                                      | -2,7%     |
| Impedance at 75 °C              | (%)        | 6,00       | 5,9      | ±10,0%                                     | -1,7%     |
| Total losses                    | (W)        | 11430      | 11135    | +0,0%                                      | -2,6%     |
| PEI :                           | (%)        |            | 99,499   | at 31 % of nominal power      Satisfactory |           |
| Short circuit current           | 29,47 kA   |            |          |  |           |
| No load power factor correction | 1,115 kVAR |            |          |  |           |

  

| Voltage drop (%) |      |      |      |      | Efficiency (%) |       |       |       |       |
|------------------|------|------|------|------|----------------|-------|-------|-------|-------|
| Load             | 4/4  | 3/4  | 2/4  | 1/4  | Load           | 4/4   | 3/4   | 2/4   | 1/4   |
| cosφ=0,9         | 3,40 | 2,53 | 1,67 | 0,83 | cosφ=0,9       | 99,02 | 99,21 | 99,38 | 99,43 |
| cosφ=1           | 0,98 | 0,71 | 0,45 | 0,21 | cosφ=1         | 99,12 | 99,29 | 99,44 | 99,49 |

**Dimensional check**      **Result:** Satisfactory

Date: 16/03/2022      Checked by: *Luca Frigo*      Customer:      Pag 1/1

## CONFORMITY DECLARATION

**Manufacturer:** TRAFO ELETTRIO srl  
**Customer No.:** C01066  
**Reference:** OV21-0421  
**Serial No.:** 11985  
**Power:** 1250 kVA  
**Type:** TES-ORR3-2  
**Description:** Oil immersed transformer  
**Year of manufacture:** 2022

This declaration of conformity is issued under the sole responsibility of the manufacturer.

**The object of the declaration described above is in conformity with the relevant Union legislation:**

- Directive 2009/125/CE of 21 October 2009
- Commission Regulation (EU) No. 548/2014 of 21 May 2014

**and is in conformity with the related standards and other applicable technical standards:**

- IEC 60076-1: Power transformers - General (20-4-2011 ed. 3.0)



Montecchio Maggiore, 16/03/2022

GENERAL MANAGER: Alessio Schenato



TRAFO ELETTRIO srl  
*Alessio Schenato*