Analyse de gaz

# Débitmètre

# SM-6, SM-6-V, S-SM 3-1

## Manuel d’utilisation et d’installation

Notice originale

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Veuillez lire attentivement le mode d'emploi avant d'utiliser l'appareil. Faites tout particulièrement attention aux indications d'avertissement et de sécurité. Dans le cas contraire, des risques sanitaires ou matériels peuvent apparaître. La responsabilité de Bühler Technologies GmbH est exclue pour toute modification de l'appareil effectuée par l'utilisateur ou toute utilisation non conforme.



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# Sommaire

# 1 Introduction

## 1.1 Utilisation conforme

Le débitmètre peut être utilisé pour afficher le débit de gaz de mesure ou de médias liquides. Vous pouvez déterminer le type de débitmètre que vous avez devant vous en consultant sa plaque signalétique. En plus du numéro de commande, vous trouverez sur celle-ci le numéro d'article et la désignation de modèle. Si un débitmètre comprend quelques spécificités, celles-ci sont décrites à part dans le mode d'emploi. Veuillez faire attention aux paramètres du débitmètre lors de son branchement et à la bonne version pour la commande de pièces de rechange.

Les débitmètres de la série SM-6/SM-6-V peuvent en outre être équipés d'un commutateur à seuil bistable. Pour les appareils de série SM-6-V, le débit peut être réglé avec la soupape à pointeau.

Pour les débitmètres de sécurité de la série S-SM, le cône de mesure est protégé par un deuxième cylindre en verre aux parois épaisses. Si le cône de mesure explose, le cylindre externe en verre assure la protection de sorte à ne pas laisser échapper de médium. Ce cylindre externe en verre est en outre protégé des dommages d'origine mécanique par un tube en acier. Vous pouvez voir les différents types de S-SM sur la fiche technique.

**INDICATION**

**En cas d'utilisation dans des zones à risque d'explosion**

Les débitmètres de type SM-6, SM6-V et S-SM 3-1 satisfont aux prescriptions générales de sécurité de la directive 2014/34/UE et sont donc adaptés à un usage dans des zones à risque d'explosion de la zone 1 (**Type S-SM 3-1 : Groupe d'explosion IIC ; Type SM-6, SM-6-V : groupe d'explosion IIB) ;** Respecter impérativement les consignes de danger). Des gaz ininflammables et inflammables du **groupe d'explosion IIB** (types SM-6 et SM-6-V) **ou IIC** (type S-SM 3-1) potentiellement explosifs dans des conditions de fonctionnement normales peuvent être acheminés dans le débitmètre (**zone 1**). La plaque signalétique des débitmètres ne comporte cependant aucun logo indiquant une protection contre l'allumage étant donné que les moyens de production ne possèdent pas de source d'allumage propre et n'entrent donc pas dans le domaine d'application de la directive 2014/34/UE.

## 1.2 Contenu de la livraison

- 1 x débitmètre
- 1 x documentation produit
- 1 x Support (seulement pour les types SM-6 / Sm-6-V)

## 1.3 Indications de commande

Le numéro d'article codifie la configuration de votre appareil. Utilisez à ce sujet les codifications suivantes :

| 4056 | XX | X | 99 | X | Plage de mesure* |
|---|---|---|---|---|---|
| | 0 0 | | | | Air 6 - 60 Nl/h |
| | 0 1 | | | | Air 10 – 100 Nl/h |
| | 0 2 | | | | Air 25 – 250 Nl/h |
| | 0 3 | | | | Air 50 - 500 Nl/h |
| | 0 4 | | | | Air 80 - 800 Nl/h |
| | 0 5 | | | | Eau 0,5 - 5 l/h |
| | 0 6 | | | | Eau 1,2 - 12 l/h |
| | 0 7 | | | | Eau 2,5 - 25 l/h |
| | 0 8 | | | | Eau 4 - 40 l/h |
| | 0 9 | | | | Eau 6 - 60 l/h |
| | 1 0 | | | | Plage de mesure particulière |
| | | 0 | | | sans soupape à pointeau |
| | | 1 | | | Soupape PVDF / Viton |
| | | 2 | | | Soupape PCTFE / Élastomère perfluoré |
| | | | | S | Commutateur à seuil avec support |
| | | | | - | sans commutateur à seuil |

* Tubes de mesure standards ; air 20 °C 1,2 bar abs ; eau 20 °C

**Indication de commande concernant le commutateur à seuil :** Un commutateur à seuil est monté en usine si un « S » est présent à la fin du numéro d'article. Sans le marquage « S », le débitmètre reste sans commutateur à seuil. Plusieurs amplificateurs TOR à séparation galvanique sont disponibles pour la commande du commutateur à seuil (voir fiche technique n° 400003).

# 2 Indications de sécurité

## 2.1 Indications importantes

L'utilisation de l'appareil n'est autorisée que si :

- le produit est utilisé dans les conditions décrites dans les instructions d'installation et de commande, conformément à la plaque signalétique et pour des applications pour lesquelles il a été conçu. Toute modification de l'appareil de votre propre chef exclut la responsabilité de Bühler Technologies GmbH,
- les indications et dénominations sur les plaques signalétiques sont respectées.
- les valeurs limites indiquées dans la fiche technique et le mode d'emploi sont respectées,
- les dispositifs de supervision / de protection sont correctement connectés,
- les travaux d'entretien et de réparation non décrits dans ce mode d'emploi sont effectués par Bühler Technologies GmbH,
- des pièces de rechange originales sont utilisées.

Ce mode d'emploi fait partie du matériel. Le fabricant se réserve le droit de modifier les données de performance, de spécification ou d'interprétation sans préavis. Conservez le mode d'emploi pour une utilisation ultérieure.

### Mots-signaux pour avertissements

| | |
|---|---|
| DANGER | Mot-signal pour désigner une menace à haut risque entraînant immédiatement la mort ou des blessures corporelles lourdes si elle n'est pas évitée. |
| AVERTISSEMENT | Mot-signal pour désigner une menace de risque intermédiaire pouvant entraîner la mort ou des blessures corporelles lourdes si elle n'est pas évitée. |
| ATTENTION | Mot-signal pour désigner une menace à faible risque pouvant entraîner des dommages matériels ou des blessures corporelles légères à moyennement graves si elle n'est pas évitée. |
| INDICATION | Mot-signal pour une information importante à propos du produit, information à laquelle il faudrait accorder une attention importante. |

### Signaux d'avertissement

Ce mode d'emploi utilise les signaux d'avertissement suivants :

| | |
|---|---|
|  Signal d'avertissement général |  Porter une protection respiratoire |
|  Avertissement d'inhalation de gaz toxiques |  Porter une protection faciale |
|  Avertissement de liquides irritants |  Porter des gants |
|  Avertissement de risque d'explosion | |

## 2.2 Indications générales de danger

L'appareil ne doit être installé que par du personnel spécialisé et familiarisé avec les exigences de sécurité et les risques.

Respectez impérativement les indications de sécurité pertinentes relatives au lieu d'installation ainsi que les règles techniques en vigueur. Évitez les défaillances et les dommages corporels et matériels.

### L'exploitant de l'installation doit s'assurer que :

- les indications de sécurité et les instructions d'utilisation sont disponibles et respectées,
- les directives nationales respectives de prévention des accidents sont respectées,
- les données et conditions d'utilisation licites sont respectés,
- les dispositifs de protection sont utilisés et les travaux d'entretien prescrits effectués,
- les réglementations légales pour la mise au rebut sont respectées,
- les prescriptions d'installation nationales en vigueur sont respectées.

### Entretien, réparation

Lors de toute opération de maintenance et de réparation, respecter les points suivants :

- Les réparations sur les outils d'exploitation doivent être uniquement effectuées par le personnel autorisé par Bühler.
- Réalisez exclusivement les travaux de modification, de maintenance ou de montage décrits dans ces instructions de commande et d'installation.
- N'utilisez que des pièces de rechange originales.
- Ne pas utiliser de pièces de rechange endommagées ou défectueuses. Avant le montage, effectuez le cas échéant un contrôle visuel afin de détecter les dommages évidents sur les pièces de rechange.

Lorsque des travaux de maintenance de toutes sortes sont effectués, les dispositions de sécurité et d'exploitation applicables du pays d'utilisation doivent être respectées.

**DANGER**

**Gaz irritants, toxiques**

Le gaz de mesure peut être dangereux pour la santé.

a) Avant de commencer tout travail de maintenance, fermez l'alimentation en gaz et, le cas échéant, rincez les conduites de gaz avec de l'air.

b) Le cas échéant, assurez une évacuation sûre du gaz.

c) Lors des travaux de maintenance, protégez-vous des gaz toxiques / irritants. Portez l'équipement de protection correspondant.

**DANGER**

**Emploi dans des espaces à risque d'explosion**


Les gaz inflammables et la poussière peuvent s'enflammer ou exploser. Evitez les sources de risque suivantes :

**Charge électrostatique (formation d'étincelles) !**

Nettoyez les parties du boîtier en plastique et les autocollants avec un chiffon humide uniquement.

Les boîtiers métalliques doivent être connectés à la terre (PE) !

**Température maximale de surface !**

La température maximale de surface $T_{surf}$ de l'appareil se règle sur la température de médium $T_{med}$. On aura $T_{surf} \leq T_{med}$.

**Températures d'auto-ignition !**

Respectez les températures d'auto-ignition des gaz explosibles et les températures maximales autorisées pour la surface $T_{surf}$ en respect des normes correspondantes.

**Risque de rupture / fuite de gaz explosifs ou toxiques possible.**

Protégez l'appareil des chocs externes ou montez-le de manière à la protéger des chocs.

**Fuite de gaz !**

Risque d'explosion et risque mortel par fuite de gaz en cas d'utilisation et de travaux de maintenance non conformes.

# 3 Transport et stockage

Les produits doivent toujours être transportés dans son emballage original ou dans un emballage de remplacement approprié.

En cas de non-utilisation, les appareils doivent être protégés de l'humidité et de la chaleur. Ils doivent être stockés dans une pièce couverte, sèche et sans poussière à une température comprise entre -10 °C et 40 °C.

# 4 Assemblage et raccordement

Les filetages de raccordement pour l'admission/l'évacuation de gaz des débitmètres sont :

| Débitmètre | Filetage |
|---|---|
| SM-6 / SM-6-V | G1/4 |
| S-SM 3-1 | NPT 1/4“ |

Veuillez trouver le schéma de montage au chapitre Dimensions [> page 20]. Les raccords doivent être vissés et scellés de façon étanche avec du ruban téflon ou une bague d'étanchéité !

## 4.1 Raccordements électriques (sécurité intrinsèque)

**AVERTISSEMENT**

**Tension dangereuse**

Le raccordement ne peut être entrepris que par des personnels formés et qualifiés.

**ATTENTION**

**Tension erronée du réseau**

Une tension de réseau erronée peut détruire l'appareil.
Lors du raccordement, faire attention à ce que la tension du réseau soit correcte conformément à la plaque signalétique.

**ATTENTION**

**Risque d'explosion pour cause de valeurs de connexion non autorisées**

Des valeurs de connexion non autorisées peuvent causer l'allumage d'un mélange de gaz potentiellement explosif.
Dans des zones à risque d'explosion, l'appareil ne doit fonctionner qu'avec une alimentation en tension à sécurité intrinsèque. L'alimentation en tension doit être appropriée à la zone correspondante. Les valeurs limites indiquées dans ce mode d'emploi doivent être respectées et ne doivent pas être dépassées, même dans le cas de variantes à deux alimentations en tension à sécurité intrinsèque séparées.
Il doit être assuré qu'aucune valeur limite n'est dépassée même en cas de dysfonctionnement, p. ex. lors d'une connexion inopinée en série ou en parallèle.
Veuillez respecter les exigences de sécurité en vigueur, p. ex. IEC/EN 60079-11 et IEC/EN 60079-14, lors de l'installation et de la mise en service d'outils d'exploitation à sécurité intrinsèque.

### 4.1.1 Montage du commutateur à seuil avec fixation (uniquement pour les types SM-6/SM-6-V)

**DANGER**

**Risque d'explosion**

**En cas d'utilisation dans des zones explosibles**
Utilisez uniquement un commutateur à seuil avec la certification correspondante.

Le commutateur à seuil est prémonté à la livraison.

- Avant la première utilisation, desserrez les vis à tête fraisée en plastique sur la plaque de fixation et positionnez le commutateur à seuil à la hauteur désirée.
- Les vis à tête fraisée en plastique doivent être refixées.
- Branchez le câble sur l'alimentation électrique.

#### Utilisation du commutateur à seuil dans une zone à risque d'explosion :

Veuillez respecter les paramètres de commutation indiqués pour les limiteurs de valeurs optionnels des types RC10-14-N3 ou RC15-14-N3 dans l’homologation PTB99ATEX2128X du chapitre Documents joints [> page 23]. Le type exact peut être obtenu à partir de la désignation de type du convertisseur de valeur limite utilisé.

## 4.1.2 Montage et raccordement du séparateur-amplificateur (uniquement pour les types SM-6/SM-6-V)

**Type MACX :** Veuillez respecter les paramètres de câblage indiqués dans les autorisations (IECExIBE100002X et IBExU10ATEX1005X) ainsi que les instructions de montage dans les modes d'emploi Documents joints [> page 23].

**Type KCD2-E2L :** Si vous utilisez un contact mécanique comme générateur d'impulsions, vous devez mettre en parallèle une résistance de 10 kOhm sur le site pour surveiller la rupture de ligne avec ce contact.

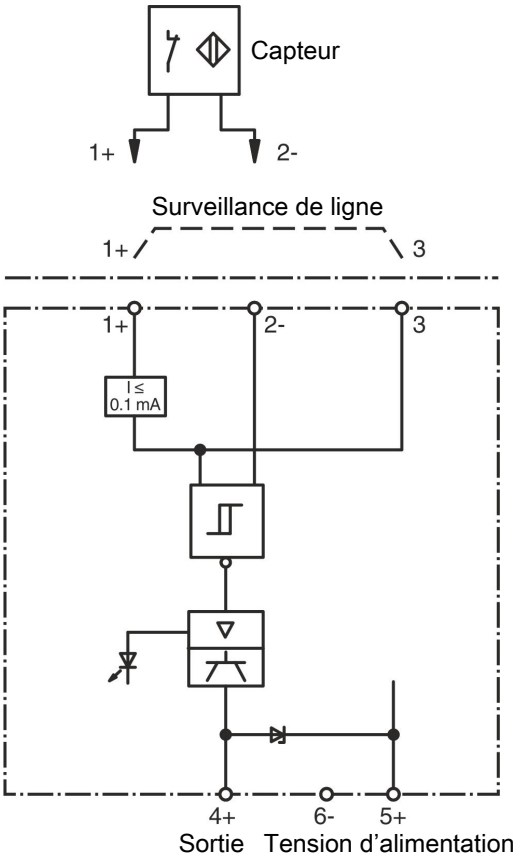
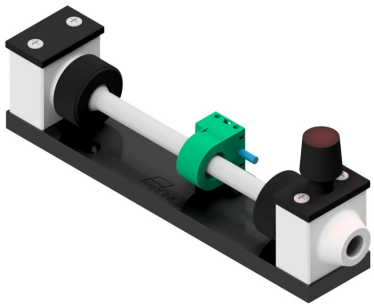
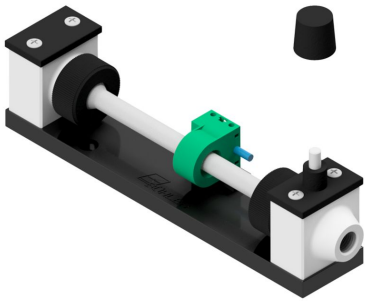



*Fig. 1: Raccordement amplificateur de coupure KCD2-E2L*

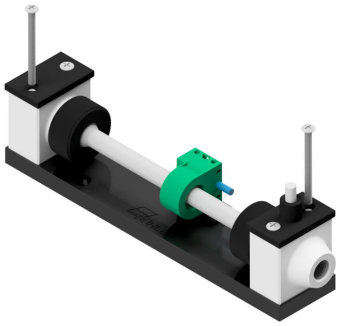
## 4.2 Montage du couvercle (n° d'art. 40158998)



– Commencez le processus de montage en enlevant délicatement le capuchon de la vanne à aiguille.



– Démontez la vis de la vanne à aiguille, en veillant à maintenir le bouton rotatif pendant le processus de desserrage pour éviter toute torsion involontaire de la vanne.



– Effectuez le démontage des vis à tête fraisée.

– Placez le couvercle à l'endroit prévu.

– Utilisez les vis à tête bombée incluses pour fixer le couvercle en toute sécurité.

– Placez la vanne à aiguille et serrez-la. Ici encore, il est important de maintenir le bouton rotatif stable pendant le serrage afin d'éviter une torsion involontaire de la vanne.

– Terminer le processus d'assemblage en replaçant le capuchon de la vanne à aiguille.

Nous vous recommandons de suivre scrupuleusement les étapes ci-dessus pour garantir un montage professionnel.

# 5 Fonctionnement et commande

**INDICATION**

L'appareil ne doit pas être exploité en dehors du cadre de ses spécifications !

**Indications concernant le fonctionnement du débitmètre avec couvercle :**

- Le couvercle est exclusivement disponible comme kit de rééquipement. Une installation en usine n'est pas prévue. Veuillez effectuer le montage sous votre propre responsabilité conformément aux instructions ci-jointes.
- Le couvercle ne doit pas être utilisé en atmosphères explosibles (zone EX). Assurez-vous que l'environnement d'application est conforme aux règles de sécurité locales.
- La couverture fixe une limite maximale de 120 °C pour la température maximale du milieu. Vérifiez que le support utilisé ne dépasse pas cette limite de température pour assurer le bon fonctionnement du couvercle

## 5.1 Consulter le débitmètre

Le débit se lit sur le bord supérieur du flotteur.

Veuillez remarquer que les valeurs ne peuvent être exactes que si la pression dans le tube de mesure correspond à la valeur imprimée.

## 5.2 Réglage de la soupape à pointeau

**INDICATION! Veuillez remarquer que la soupape à pointeau n'est PAS une vanne d'arrêt. Nous vous prions de ne pas tenter de continuer à serrer la vanne en forçant plus.**

Pour fermer la vanne, tournez dans le sens des aiguilles d'une montre.

# 6 Entretien

Lors de toute opération de maintenance, respecter les points suivants :

- L'appareil ne doit être installé que par du personnel spécialisé et familiarisé avec les exigences de sécurité et les risques.
- Effectuez seulement les travaux de maintenance décrits dans ces instructions de commande et d'installation.
- Lorsque vous effectuez des travaux de maintenance de toute sorte, respectez les dispositions de sécurité et d'exploitation.
- N'utilisez que des pièces de rechange originales.

**DANGER**


**Risque d'explosion**

**Fuite de gaz sur le débitmètre**

Si des gaz explosifs, toxiques ou irritants traversent le débitmètre, l'étanchéité de celui-ci devrait être régulièrement vérifiée.

**DANGER**

**Gaz toxiques ou irritants**

Le gaz de mesure peut être dangereux pour la santé.

a) Avant de commencer tout travail d'entretien, le processus doit être arrêté (éliminer la pression). Pour ce faire, fermez la vanne d'arrêt (s'il y en a une).

b) Rincez le débitmètre avec de l'air avant de l'ouvrir.

c) Lors des travaux d'entretien, protégez-vous des gaz toxiques/irritants. Portez un équipement de protection approprié.

**ATTENTION**

**Fuite de gaz**

Ne réutilisez pas les pièces ou les joints endommagés.
Utilisez uniquement des pièces de rechange originales.

# 6.1 Changement du commutateur à seuil avec fixation (uniquement pour les types SM-6 / SM-6-V)

**DANGER** **Risque d'explosion**

**En cas d'utilisation dans des zones explosibles**
Utilisez uniquement un commutateur à seuil avec la certification correspondante.

Retirez les vis fraisées en plastiques (1) de la plaque de fixation du commutateur à seuil (voir Fig. 1). La plaque de serrage au dos du débitmètre se détache dans le même temps.

Desserrez les deux écrous de raccordement du tube de mesure. Poussez le tube de mesure dans la pièce de tête supérieure en forçant légèrement. Le tube de mesure peut maintenant être sorti en le basculant (voir Fig. 2). Sur le dessous du tube de mesure, enlevez la bague d'étanchéité (2), l'écrou d'accouplement (3) et le commutateur à seuil (4). Le tube de mesure peut être nettoyé si besoin est.

Le montage du tube de mesure équipé d'un commutateur à seuil s'effectue dans l'ordre inverse. Veiller à ce que le chanfrein de la bague d'étanchéité soit orienté vers la pièce de tête correspondante.

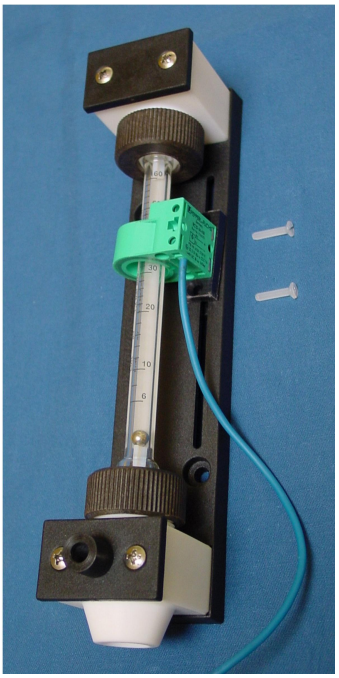


Fig. 1

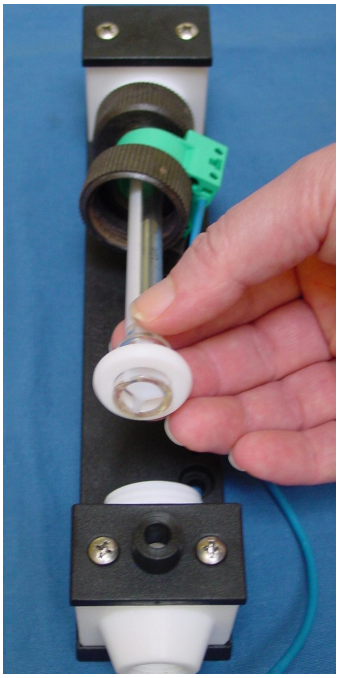


Fig. 2

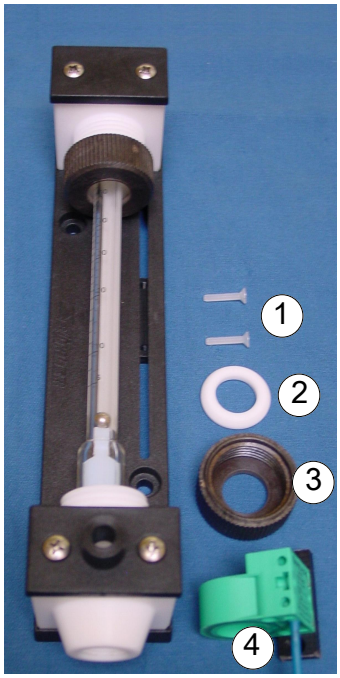



Fig. 3

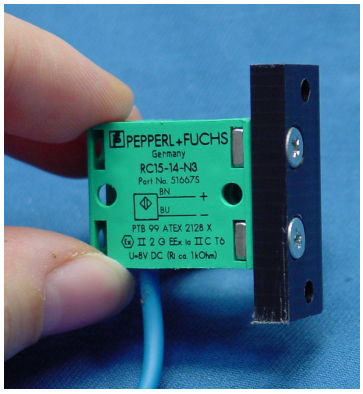



Fig. 4

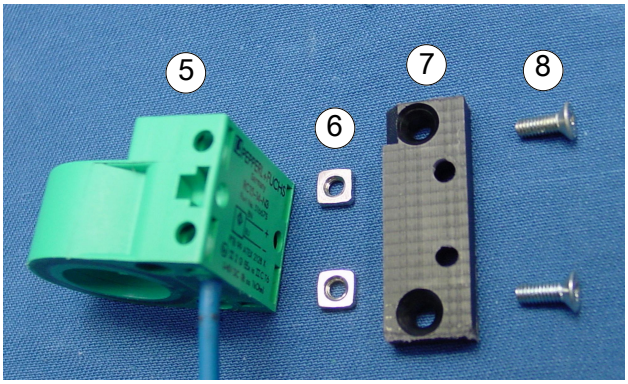



Fig. 5

| | | | |
|---|---|---|---|
| 1 | Vis à tête fraisée en plastique | 3 | Écrou d'accouplement |
| 2 | Bague d'étanchéité | 4 | Commutateur à seuil avec plaque de fixation |
| 5 | Commutateur à seuil | 7 | Plaque de fixation fraisée |
| 6 | Écrous carrés M3 | 8 | Vis cruciformes |

Desserrez les deux vis cruciformes (8) sur la plaque de fixation du commutateur à seuil (voir Fig. 4). Enlevez la plaque de fixation (7). Faites attention à ce que les deux écrous carrés (6) ne tombent pas dans les fentes du commutateur à seuil ! Remplacez le commutateur à seuil (5) et vissez la plaque de fixation. Le chanfrein fraisé de la plaque de fixation (7) doit être orienté en haut à gauche.

Le commutateur à seuil peut maintenant être réinséré dans le tube de mesure. Ce faisant, faites attention au sens du débit. La graduation doit être lisible, la plaque de fixation du commutateur à seuil doit être mise en place avec les trous de vis sur le trou oblong et le câble doit sortir par dessous.

Glissez ensuite l'écrou d'accouplement et la bague d'étanchéité (avec le cône d'étanchéité comme support) sur le tube de mesure. Remettez en place le tube de mesure et vissez l'écrou d'accouplement à la main.

Avec les deux vis à tête fraisée en plastique, la plaque de fixation peut maintenant être vissée et ajustée avec la plaque de serrage à l'arrière par le biais de l'ouverture oblongue dans la plaque de base du débitmètre.

## 6.2 Changement du verre de mesure (seulement pour les types SM-6/SM-6V)

Il est nécessaire, en présence d'un couvercle, de le démonter avant de remplacer le verre.

### 6.2.1 Sans commutateur à seuil

Desserrez les deux écrous d'accouplement du tube de mesure. Insérez le verre de mesure dans la pièce de tête supérieure en forçant légèrement. Vous pouvez maintenant déplacer les bagues d'étanchéité placées sous les écrous d'accouplement sur la partie amincie du verre de mesure. Le tube de mesure peut maintenant être sorti en basculant.

Les écrous d'accouplement et les bagues d'étanchéité peuvent maintenant être enlevés du tube de mesure et, si besoin est, glissés sur le nouveau tube de mesure. Le montage du verre de mesure s'effectue dans l'ordre inverse. Veiller à ce que le chanfrein de la bague d'étanchéité soit orienté vers la pièce de tête correspondante.

### 6.2.2 Avec commutateur à seuil

Desserrez la vis à tête fraisée en plastique du haut (1) de la plaque de fixation du commutateur à seuil (voir Fig. I) et desserrez légèrement la vis à tête fraisée en plastique du bas (1) de sorte à pouvoir déplacer librement le commutateur à seuil. Ce faisant, il n'est pas nécessaire de retirer entièrement la plaque de fixation.

Enlevez les deux écrous d'accouplement (3) du tube de mesure. Insérez le verre de mesure dans la pièce de tête supérieure en forçant légèrement. Tournez le commutateur à seuil sur le côté (voir Fig. 6) lorsque vous retirez le verre de mesure du commutateur à seuil ainsi que de l'écrou d'accouplement Ce faisant, déplacez le commutateur à seuil si nécessaire. Sur le dessous du verre de mesure, enlevez la bague d'étanchéité (2) et l'écrou d'accouplement (3). Le commutateur à seuil reste sur la plaque de serrage (voir Fig. 7).

Le montage du tube de mesure s'effectue dans l'ordre inverse. Veiller à ce que le chanfrein de la bague d'étanchéité soit orienté vers la pièce de tête correspondante.

Fig. 6

Fig. 7

## 6.3 Changement du verre de mesure - débitmètre de sécurité S-SM

**INDICATION! Ce changement doit être effectué avec beaucoup de précautions ! Ne l'effectuez que si vous êtes sûr de le maîtriser. Nous recommandons d'envoyer le S-SM au fabricant.**

Dévissez une extrémité du tube de protection VA. Ce faisant, tenez le débitmètre de sorte à ce que lorsque l'embout est enlevé, le verre de protection et le tube de mesure ne puissent pas glisser d'eux-mêmes. Le tube de mesure peut maintenant être retiré.

Lors du montage du nouveau tube de mesure, il fait faire attention à ce que celui-ci et le tube de protection tiennent bien dans les logements de joint torique de l'embout.

# 7 Entretien et réparation

Si une panne se produit en fonctionnement, vous trouverez dans ce chapitre des indications de détection et de résolution.

Les réparations sur les outils d'exploitation doivent être uniquement effectuées par le personnel autorisé par Bühler.

Si vous avez d'autres questions, veuillez vous adresser à notre service :

**Tél. : +49-(0)2102-498955** ou votre représentant compétent

Vous trouverez de plus amples informations sur nos services de maintenance et de mise en service sous https://www.buehler-technologies.com/service.

Si le fonctionnement n'est pas correct après l'élimination d'éventuelles perturbations et après la mise sous tension, l'appareil doit être vérifié par le fabricant. À cet effet, veuillez expédier l'appareil dans un emballage approprié à :

**Bühler Technologies GmbH**

**- Réparation/Maintenance -**

**Harkortstraße 29**

**40880 Ratingen**

**Allemagne**

Ajoutez en outre à l'emballage la déclaration de décontamination RMA remplie et signée. Dans le cas contraire, il nous sera impossible de traiter votre demande de réparation.

Le formulaire se trouve en annexe à ce mode d'emploi. Il peut également être demandé par courriel :

**service@buehler-technologies.com**.

## 7.1 Recherche de cause de panne et résolution

| Problème / Défaillance | Cause possible | Assistance |
|---|---|---|
| Le flotteur ne monte pas | – Soupape à pointeau fermée | – Ouvrez la soupape à pointeau |
| | – Salissures par poussière | – Nettoyez |

*Tab. 1:* Recherche de cause de panne et résolution

## 7.2 Pièces de rechange

Lors de la commande de pièces de rechange, nous vous demandons d'indiquer le type d'appareil et le numéro de série.

Vous pouvez trouver des ensembles de rééquipement et des ensembles supplémentaires dans notre catalogue.

Vous devriez avoir une réserve des pièces de rechanges suivantes :

| N° d'article | Désignation |
|---|---|
| 40158997 | Bague d'étanchéité pour diamètre de tube en verre Ø 10 mm |
| 4055050 | Bague d'étanchéité pour diamètre de tube en verre Ø 15 mm |

## 7.2.1 Matériaux consommables et accessoires - SM-6, SM-6-V

| N° d'article | Désignation |
|---|---|
| 40158998 | Couvercle SM-6, SM-6-V |

**INDICATION**

**Remarques importantes lors de l'utilisation d'un couvercle**

- Couverture uniquement disponible comme kit de rééquipement.
- Ne convient pas aux atmosphères explosibles.
- Température maximale du milieu limitée à 120 °C.

## 7.2.2 Matériaux consommables et accessoires - S-SM

| N° d'article | Désignation | |
|---|---|---|
| 4022999 | Débitmètre S-SM 3-1 | Embouts acier inoxydable 1.4571 |
| 4023999 | Débitmètre S-SM 3-1 | Embouts titane |

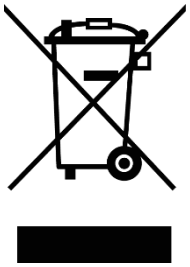
## 7.2.3 Matériaux consommables et accessoires - Séparateur-amplificateur

| N° d'article | Désignation |
|---|---|
| 9100070059 | Amplificateur séparateur MACX |
| 9100070007 | Séparateur-amplificateur KCD2-E2L, 24 V DC |
| 4949021 | Commutateur à seuil avec support Ø 10 |
| 4949019 | Séparateur-amplificateur avec support Ø 15 |

# 8 Mise au rebut

Lors de la mise au rebut des produits, les prescriptions légales nationales respectivement applicables doivent être prises en compte et respectées. Aucun risque pour la santé et l'environnement ne doit résulter de la mise au rebut.

Le symbole de poubelle barrée sur roues apposé sur les produits de Bühler Technologies GmbH signale des consignes de mise au rebut particulières au sein de l'Union Européenne (UE) applicables aux produits électriques et électroniques.



Le symbole de poubelle barrée signale que les produits électriques et électroniques ainsi désignés ne doivent pas être jetés avec les ordures ménagères. Ils doivent être éliminés de manière appropriée comme appareils électriques et électroniques.

Bühler Technologies GmbH s'occupe volontiers de la mise au rebut de votre appareil arborant ce sigle. Veuillez pour ceci envoyer votre appareil à l'adresse ci-dessous.

La loi nous oblige à protéger nos employés des risques causés par des appareils contaminés. Nous ne pouvons donc effectuer la mise au rebut de votre ancien appareil que si celui-ci ne contient pas d'agents de fonctionnement agressifs, corrosifs ou nocifs pour la santé et l'environnement. Nous vous prions donc de faire preuve de compréhension. **Pour chaque appareil électrique et électronique usagé, il convient d'établir le formulaire « Formulaire RMA et déclaration de décontamination » disponible sur notre site Internet. Le formulaire rempli doit être apposé sur l'emballage de manière visible de l'extérieur.**

Pour le retour d'appareils électriques et électroniques usagés, veuillez utiliser l'adresse suivante :

Bühler Technologies GmbH
WEEE
Harkortstr. 29
40880 Ratingen
Allemagne

Tenez compte des règles en matière de protection de données et du fait que vous êtes responsable de l'absence de toute donnée personnelle sur les anciens appareils rapportés par vos soins. Assurez-vous donc de bien supprimer toute donnée personnelle lors de la restitution de votre appareil usagé.

# 9 Pièces jointes

## 9.1 Caractéristiques techniques

| Débitmètre | SM-6 | SM-6-V |
|---|---|---|
| Température ambiante du gaz : | de -20 °C à +80 °C * | de -20 °C à +80 °C * |
| Température ambiante des fluides : | +5 °C bis +80 °C * | +5 °C bis +80 °C * |
| Température de fluide : | ≤ 150 °C, en cas de plages de mesure particulières max. 80 °C | ≤ 130 °C, en cas de plages de mesure particulières max. 80 °C |
| Pression de service max. : | 4 bar | 4 bar |
| Contrainte mécanique : | Testé sur la base de DNV-GL CG0339 **<br>Classe de vibration A (0,7 g)<br>2 Hz-13,2 Hz Amplitude ± 1,0 mm<br>13,2 Hz -100 Hz 0,7 g accélération | Testé sur la base de DNV-GL CG0339 **<br>Classe de vibration A (0,7 g)<br>2 Hz-13,2 Hz Amplitude ± 1,0 mm<br>13,2 Hz -100 Hz 0,7 g accélération |
| **Matériau** | | |
| Têtes : | PTFE | PTFE |
| Joint : | PTFE | PTFE |
| Broche de réglage : | - | PVDF/Viton ou PCTFE/élastomer perfluoré |
| Tube de mesure : | verre borosilicaté | verre borosilicaté |
| Flotteur : | Hastelloy C 4 | Hastelloy C 4 |
| Écrou d'accouplement : | PPS renforcé à la fibre de verre | PPS renforcé à la fibre de verre |
| Plaque de base : | PA | PA |

* Respecter la température ambiante en cas de configuration avec des commutateur à seuil !
** non en cas d'utilisation d'un débitmètre avec couvercle.

| Commutateur à seuil | Ø 10* | Ø 15 |
|---|---|---|
| Type de protection : | IP 67 | IP 67 |
| Température ambiante : | de -20 °C à +80 °C | de -20 °C à +70 °C |
| Matériau de boîtier : | PBT | PBT |
| Fonctionnement : | bistable | bistable |
| Longueur de câble : | 2 m | 2 m |
| Autorisation : | PTB 99 ATEX 2128X<br>Ex II 2 G Ex ia II C T6...T1 Gb | PTB 99 ATEX 2128X<br>Ex II 2 G Ex ia II C T6...T1 Gb |

* Utilisation possible dans la plage de mesure spéciale. Plus d'informations sur demande.

| Débitmètre de sécurité S-SM 3-1 | |
|---|---|
| Température ambiante : | de -20 °C à 80 °C * |
| Pression de service : | 10 bars (à max. 20 °C) ** |
| Température de fonctionnement : | 100 °C (à max. 2 bars) ** |
| Plage de mesure : | voir tableau |
| Poids : | 0,9 kg |
| Flotteur : | Verre, Hastelloy, acier inoxydable ou PTFE |
| Embouts : | PTFE, acier inoxydable ou titane |
| Fixation : | avec les colliers fournis |

* à indiquer lors de la commande, sélection de la fixation.

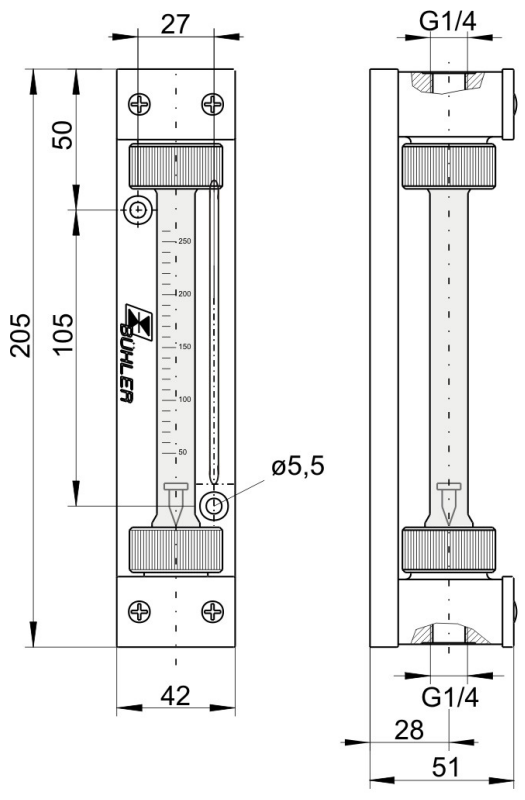
** Pression max. de fonctionnement [bar] = $10 - \frac{\text{Température de fonctionnement max. [°C]} - 20}{10}$

| Amplificateur séparateur | MACX MCR-EX-SL-2NAM-R-UP | KCD2-E2L |
|---|---|---|
| Tension d'alimentation : | 24 ... 230 V AC/DC 50/60 Hz | 10 - 30 V DC |
| Sécurité intrinsèque selon : | IEC/EN 60079-11 | non |
| Surveillance de ligne : | oui | oui |
| Autorisations :<br>*(selon mode d'emploi)* | **ATEX :** ⟨Ex⟩ II(1) G [Ex ia Ga] IIC<br>⟨Ex⟩ II 3(1) G Ex ec [ia Ga] nC IIC T4 Gc<br>**IECEx :** [Ex ia Ga] IIC<br>Ex ec [ia Ga] nC IIC T4 Gc | --- |
| Sortie (sans sécurité intrinsèque) : | Inverseur | Fermeur<br>Transistor PNP |
| Sortie de courant de commutation : | 250 V AC (2 A, 60 Hz)<br>120 V DC (0,2 A)<br>30 V DC (2 A) | 200 mA DC |
| Température ambiante : | -40 °C ...+60 °C | -25 °C ...+70 °C |
| Type de protection : | IP20 | IP20 |
| Dimensions : | 17,5 x 112,5 x 114,5 mm<br>(l x h x p) | 20 x 63 x 44 mm<br>(l x h x p) |

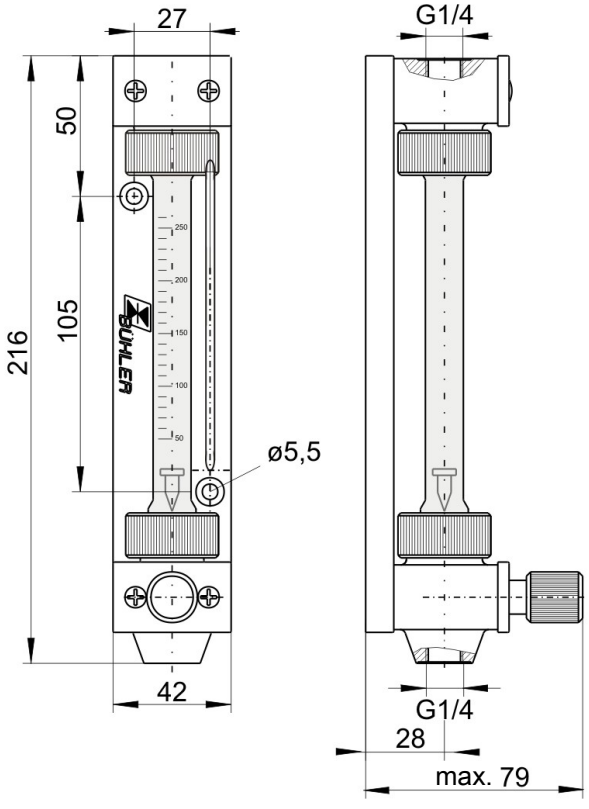
## 9.2 Dimensions

**Débitmètre SM6/SM6-V :**

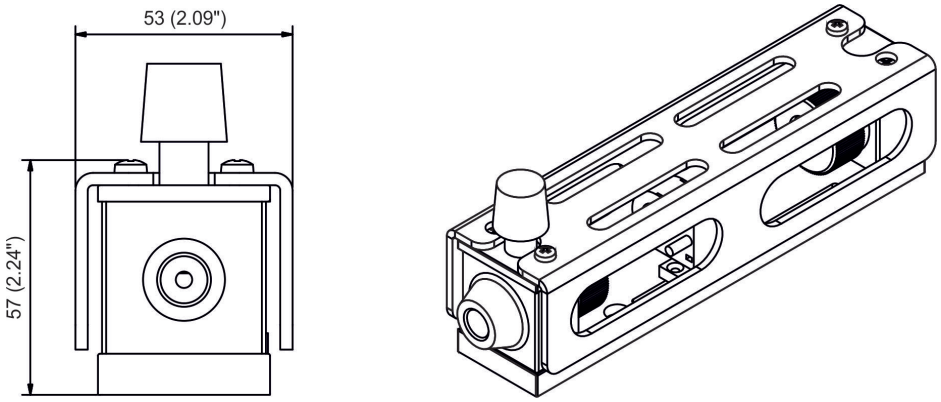
SM-6



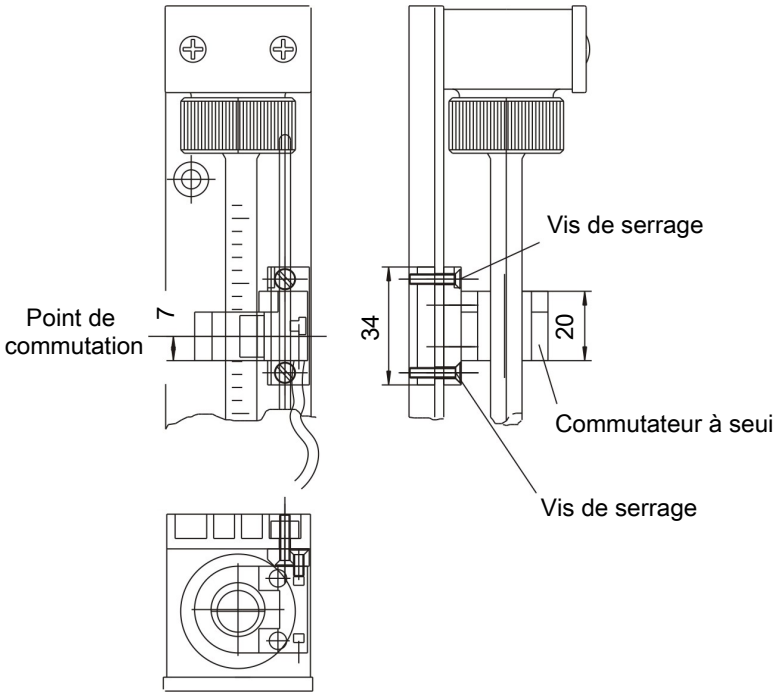

SM-6-V



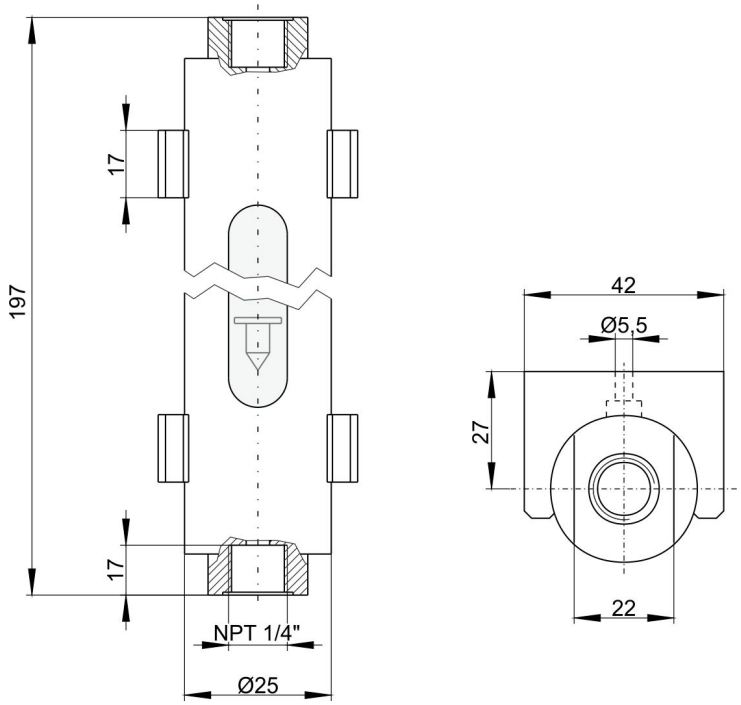
**Débitmètre avec couvercle :**




**Commutateur à seuil :**




**Débitmètre de sécurité S-SM :**



## 9.3 Plages de mesure

| | Débitmètre SM-6 | |
|---|---|---|
| Fluide : | Air | Eau |
| Pression : | + 1,2 bar abs. | |
| Température : | + 20 °C | + 20 °C |
| | 6 ... 60 Nl/h | 0,5 ... 5 l/h |
| | 10 ... 100 Nl/h | 1,2 ... 12 l/h |
| | 25 ... 250 Nl/h | 2,5 ... 25 l/h |
| | 50 ... 500 Nl/h | 4 ... 40 l/h |
| | 80 ... 800 Nl/h | 6 ... 60 l/h |

| | Débitmètre S-SM 3-1 | |
|---|---|---|
| Fluide : | Air | Eau |
| Pression : | + 1,2 bar abs. | |
| Température : | + 20 °C | + 20 °C |
| | 1,6 – 16 Nl/h | 0,25 - 2,5 l/h |
| | 4 – 40 Nl/h | 0,5 - 5 l/h |
| | 6 - 60 Nl/h | 1,2 - 12 l/h |
| | 10 – 100 Nl/h | 2,5 - 25 l/h |
| | 25 – 250 Nl/h | |
| | 50 – 500 Nl/h | |
| | 80 – 800 Nl/h | |

# 10 Documents joints

- Déclaration de fabricant UE HX400001
- UK-Manufacturer Declaration HX400001UK
- Déclaration de conformité KCD2-E2L
- Manuel de l'utilisateur MACX
- Déclaration de conformité EU MACX
- UK-Declaration of Conformity MACX
- EU-Type Examination Certificate MACX (IBExU10ATEX1005 X)
- IECEx Certificate of Conformity MACX (IECExIBE100002X)
- Déclaration de conformité UE RC10/RC15
- UK-Declaration of Conformity RC10/RC15
- Certificat d'examen de type RC10/RC15 (PTB99ATEX2128X)
- UK Type Examination Certificate RC10/RC15 (CML 21UKEX21274X)
- RMA - Déclaration de décontamination

# *Herstellererklärung*
# *Manufacturer Declaration*

Hiermit erklärt Bühler Technologies GmbH, dass die nachfolgenden Produkte keine „Geräte" im Sinne der Richtlinie **2014/34/EU (Atex)** sind und somit nicht mit einem CE-Zeichen versehen sind.

*Herewith Bühler Technologies GmbH declares that the following products are not „equipment" for the purpose of Directive **2014/34/EU (Atex)**, respectively, and therefore are not labeled with the CE mark.*

**Produkt / products:** Strömungsmesser / *Flow meter*
**Typ / type:** SM-6, SM-6-V, S-SM 3-1

Die Produkte besitzen keine eigenen Zündquellen, wenn die Sicherheitsbestimmungen der zugehörigen Technischen Dokumentation, wie Betriebsanleitungen und Datenblätter, eingehalten und die einschlägigen Sicherheitsvorschriften des Explosionsschutzes gemäß ATEX-Richtlinie umgesetzt werden. Die Produkte dürfen nur von qualifizierten Fachpersonal installiert, betrieben, gewartet oder gereinigt werden.
*The products do not have their own ignition sources if the safety regulations in the relevant technical documentation, such as instruction manuals and datasheets, and the relevant safety regulations of explosion protection per the ATEX directive are followed. The products may only be installed, operated, maintained or cleaned by qualified specialist personnel.*

Die Produkte sind für den Einsatz in explosionsgefährdeten Bereichen der Zone 1, Explosionsgruppe IIC (Typ S-SM-3-1) bzw. Explosionsgruppe IIB (Typen SM-6, SM-6-V), geeignet.
Alle Typen können zur Anzeige der Durchflussmenge von Gasen oder flüssigen Medien verwendet werden. Durch die Strömungsmesser können nichtbrennbare Gase und brennbare Gase, die im Normalbetrieb gelegentlich explosiv sein können, geleitet werden (Zone 1, Explosionsgruppe IIC (Typ S-SM 3-1) oder Explosionsgruppe IIB (Typ SM-6, SM-6-V)).
*The products are suitable for use in potentially explosive atmospheres of zone 1, explosion group IIC (type S-SM-3-1) or explosion group IIB (types SM-6, SM-6-V).*
*All types can be used to display the flow rate of gases or liquid media. Non-flammable gases and flammable gases, which can occasionally be explosive in normal operation, can be channelled through the flow meters (zone 1, explosion group IIC (type S-SM 3-1) or explosion group IIB (type SM-6, SM-6-V)).*

Die im Produkt optional verbauten Grenzwertgeber sind eigensichere Komponenten mit separatem ATEX-Zertifikat (PTB 99 ATEX 2128X) und ATEX-Kennzeichnung.
Bezüglich der elektrischen Versorgung der Grenzwertgeber müssen die Grenzwerte der Beschaltungswerttabellen des zugehörigen ATEX-Zertifikats eingehalten werden. Die Eigensicherheit des Stromkreises kann andernfalls gefährdet sein. Lesen Sie dazu die exakte Typbezeichnung am jeweils verbauten Grenzwertgeber ab und entnehmen die zugehörigen Grenzwerte aus der Grenzwerttabelle des ATEX-Zertifikats.
Der im Datenblatt Nr. 400003 aufgeführte, für den Explosionsschutz zertifizierte Trennschaltverstärker hält den erforderlichen Grenzwertbereich der optionalen Grenzwertgeber ein.
*The limit switches optionally installed in the product are intrinsically safe components with a separate ATEX certificate (PTB 99 ATEX 2128X) and ATEX labelling.*
*The limit values of the wiring value tables of the associated ATEX certificate must be observed with regard to the electrical supply of the limit switches. Otherwise, the intrinsic safety of the circuit may be jeopardised.*
*Read the exact type designation on the limit switch installed and take the corresponding limit values from the limit value table of the ATEX certificate.*
*The isolation switching amplifier listed in data sheet No. 400003, which is certified for explosion protection, complies with the required limit value range of the optional limit value transmitters.*

Die Produkte dieser Herstellererklärung erfüllen die einschlägigen Harmonisierungsrechtsvorschriften der Union:
*The products in this manufacturer's declaration comply with the relevant Union harmonisation legislation:*

**EN ISO 80079-36:2016** **EN ISO 80079-37:2016**

Zusätzlich wurden folgende nationale Normen, Richtlinien oder Spezifikationen berücksichtigt:
*In addition, the following national standards, guidelines or specifications have been used:*

**TRGS 727**

Die alleinige Verantwortung für die Ausstellung dieser Herstellererklärung trägt der Hersteller.
*This declaration of manufacture is issued under the sole responsibility of the manufacturer.*
Dokumentationsverantwortlicher für diese Herstellererklärung ist Herr Stefan Eschweiler mit Anschrift am Firmensitz.
*The person authorised to compile the technical file is Mr. Stefan Eschweiler located at the company's address.*

Ratingen, den 06.09.2024

Stefan Eschweiler
Geschäftsführer – *Managing Director*

Frank Pospiech
Geschäftsführer – *Managing Director*



Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
Tel. +49 (0) 21 02 / 49 89-0, Fax. +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com

# Manufacturer Declaration

Herewith Bühler Technologies GmbH declares that the following products are not „equipment" for the purpose of legislation **Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016** respectively, and therefore are not labelled with the UKCA mark.

**Product:** Flow meter
**Types:** SM-6
SM-6-V
S-SM 3-1

This declaration is valid for all devices manufactured in accordance with the manufacturing documents deposited with the manufacturer – which form an integral part of this declaration.

The products do not have their own ignition sources if the safety regulations in the relevant technical documentation, such as instruction manuals and datasheets, and the relevant safety regulations of explosion protection per the ATEX directive are followed. The products may only be installed, operated, maintained or cleaned by qualified specialist personnel.

The products are suitable for use in potentially explosive atmospheres of zone 1, explosion group IIC (type S-SM-3-1) or explosion group IIB (types SM-6, SM-6-V).
All types can be used to display the flow rate of gases or liquid media. Non-flammable gases and flammable gases, which can occasionally be explosive in normal operation, can be channelled through the flow meters (zone 1, explosion group IIC (type S-SM 3-1) or explosion group IIB (type SM-6, SM-6-V)).

The limit switches optionally installed in the product are intrinsically safe components with a separate ATEX certificate (PTB 99 ATEX 2128X) and ATEX labelling.
The limit values of the wiring value tables of the associated ATEX certificate must be observed with regard to the electrical supply of the limit switches. Otherwise, the intrinsic safety of the circuit may be jeopardised.
Read the exact type designation on the limit switch installed and take the corresponding limit values from the limit value table of the ATEX certificate.
The isolation switching amplifier listed in data sheet No. 400003, which is certified for explosion protection, complies with the required limit value range of the optional limit value transmitters.

The object of the declaration described above is in conformity with the relevant designated standards:

**EN ISO 80079-36:2016** **EN ISO 80079-37:2016**

In addition, the following standards have been used:

**TRGS 727**

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

Ratingen in Germany, 06.09.2024

Stefan Eschweiler
Managing Director

Frank Pospiech
Managing Director



Bühler Technologies GmbH, Harkortstr. 29, D-40880 Ratingen,
Tel. +49 (0) 21 02 / 49 89-0, Fax. +49 (0) 21 02 / 49 89-20
Internet: www.buehler-technologies.com

# EU-Declaration of conformity

**en**/de

*EU-Konformitätserklärung*

Pepperl+Fuchs SE
Lilienthalstraße 200
68307 Mannheim
Germany
Phone +49 621 776-0
Fax +49 621 776-1000

No. / *Nr.*: DOC-1004C
Date / *Datum*: 2021-10-29


**www.pepperl-fuchs.com**

PEPPERL+FUCHS

## Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

## Products / *Produkte*

| **Product** / *Produkt* | **Item number** | **Description** / *Beschreibung* |
|---|---|---|
| KCD2-EL | 018357 | Sensor output interface terminal |
| KCD2-E2L | 018358 | Sensor output interface terminal |
| KCD2-R | 019498 | Sensor output interface terminal |
| KCD2-E1 | 269795 | Sensor output interface terminal |
| KCD2-E3 | 268567 | Sensor output interface terminal |

## Directives and Standards / *Richtlinien und Normen*

| **EU-Directive** *EU-Richtlinie* | **Standards** *Normen* |
|---|---|
| **2014/30/EU (EMC)** (L96/79-106) | EN 61326-1:2013 |
| **2011/65/EU (RoHS)** (L174/88-110) | EN IEC 63000:2018-12 |

## Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

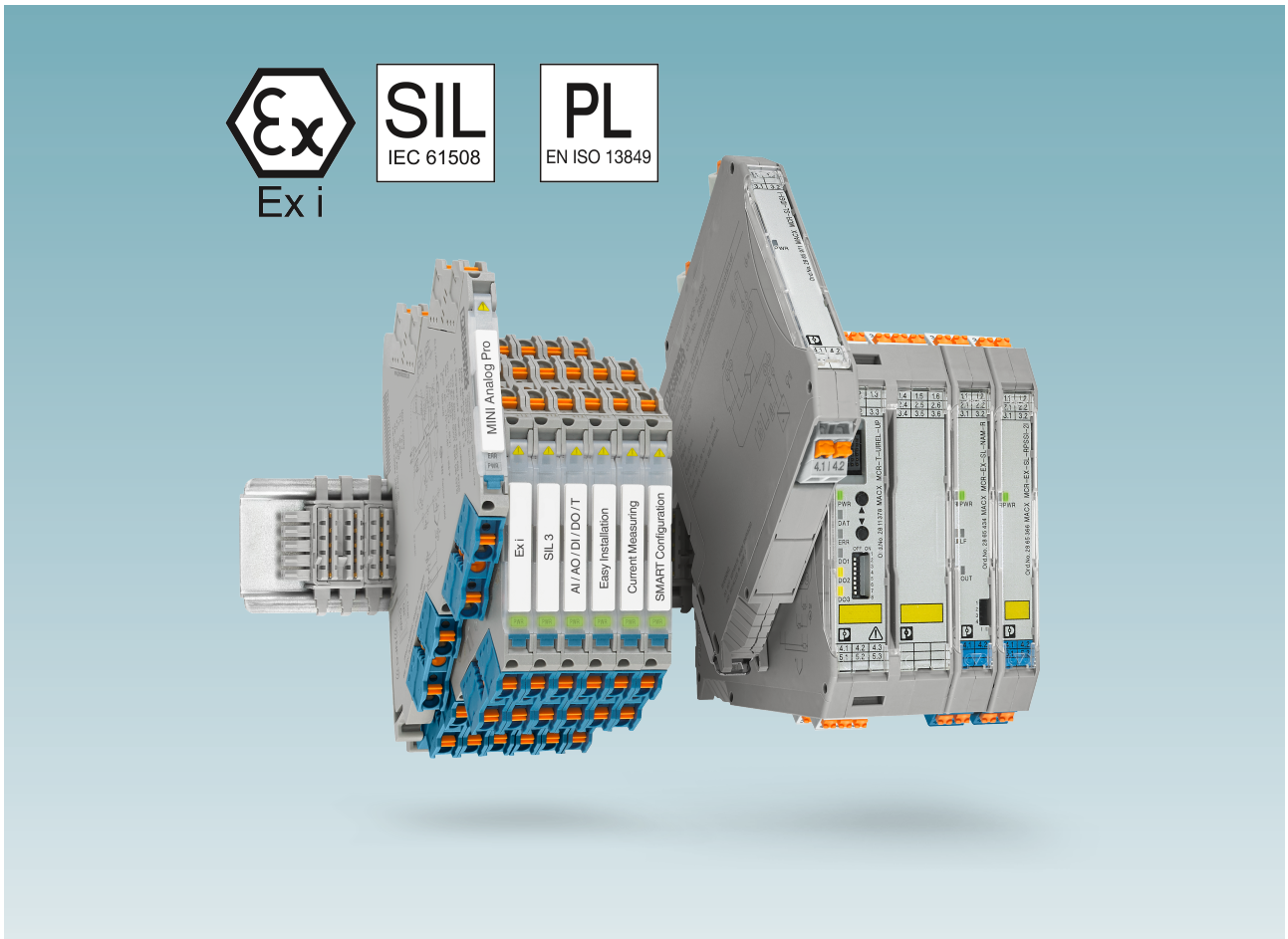
CE

## Signatures / *Unterschriften*

Mannheim, 2021-10-29

i.V. Sebastian Stöber
Director Business Unit SYSTEMS

i.V. Wolfram Warnecke
Approval Engineer




# Power manual for signal conditioners and MINI Analog, MINI Analog Pro, MACX Analog measuring transducers

User manual

PHOENIX CONTACT

# User manual

# Power manual for signal conditioners and MINI Analog, MINI Analog Pro, MACX Analog measuring transducers

UM EN Power Manual, Revision 02 2024-07-29

This manual is valid for:

| Designation |
| --- |
| MINI Analog MINI MCR-... product family |
| MINI Analog Pro MINI MCR-2-... product family |
| MINI Analog Pro MINI MCR-EX... product family |
| MACX Analog MACX MCR-... product family |
| MACX Analog Ex MACX MCR-EX... product family |

| Accessories | Item No. |
| --- | --- |
| ME 6,2 TBUS-2 1,5/5-ST-3,81 GN | 2869728 |
| ME 6,2 TBUS-2 1,5/5-ST-3,81 GY | 2695439 |
| ME 17,5 TBUS 1,5/5-ST-3,81 KMGY | 2713645 |
| ME 17,5 TBUS | 1090049 |
| ME-TBUS-A-MC-1,5-2 | 1351974 |
| ME-TBUS-A-IMC-1,5-2 | 1351982 |
| MCR-DP | 1430594 |
| QUINT4-SYS-PS/1AC/24DC/2,5/SC | 2904614 |
| QUINT4-PS/1AC/24DC/3,8/SC | 2904599 |
| TC-MACX-MCR-PTB | 2904673 |

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phoenixcontact.com

# Table of contents

# 1 For your safety

Read this manual carefully and keep it for future reference.

## 1.1 Identification of warning notes

This symbol indicates hazards that could lead to personal injury.

There are three signal words indicating the severity of a potential injury.

**DANGER**

Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury.

**WARNING**

Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.

**CAUTION**

Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.

This symbol together with the **NOTE** signal word warns the reader of actions that might cause property damage or a malfunction.

Here you will find additional information or detailed sources of information.

## 1.2 Qualification of users

The use of products described in this manual is oriented exclusively to:

– Electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.
– Qualified application programmers and software engineers. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

## 1.3 Safety notes

You can download the latest documents from phoenixcontact.com/products

**NOTE: Connection notes**
When using the DIN rail connector, you may only connect one SELV or PELV circuit to the supply terminals of the modules.

### 1.3.1 Installation notes

Installation, operation, and maintenance may only be carried out by qualified electricians. When using the device, observe the installation notes in the data sheet at phoenixcontact.com/products.

### 1.3.2 Use in potentially explosive areas (zone 2/Ex i)

When using the device in applications in potentially explosive areas, observe the instructions in the data sheet at phoenixcontact.com/products, as the requirements may deviate under these circumstances.

### 1.3.3 Safety-related applications (SIL)

When using the device in safety-related applications, observe the instructions in the data sheet at phoenixcontact.com/products, as the requirements may differ for safety-related functions.

### 1.3.4 System power supplies

To ensure that the device is operated safely and all functions can be used, read this manual carefully. You will find further information in the corresponding data sheet at phoenixcontact.com/products.

# 2 General notes on the supply of Phoenix Contact signal conditioners

Observe the corresponding packing slip for the relevant products.

**NOTE: Connection notes**
When using the DIN rail connector, you may only connect one SELV or PELV circuit to the supply terminals of the modules.

All active signal conditioners from Phoenix Contact can either be supplied directly via terminal blocks on the module or wired individually. Wiring each individual module is very time-consuming and costly, especially when dealing with large quantities of signal conditioners that are mounted side by side on the DIN rail. This is why, depending on the signal conditioners used and the supply options, Phoenix Contact offers the option of supplying a complete standard DIN rail fitted with signal conditioners via a single power terminal by means of the TBUS DIN rail connector. Time-consuming and error-prone wiring of single-core wiring is thus eliminated. You can supply the DIN rail connector in the following ways:

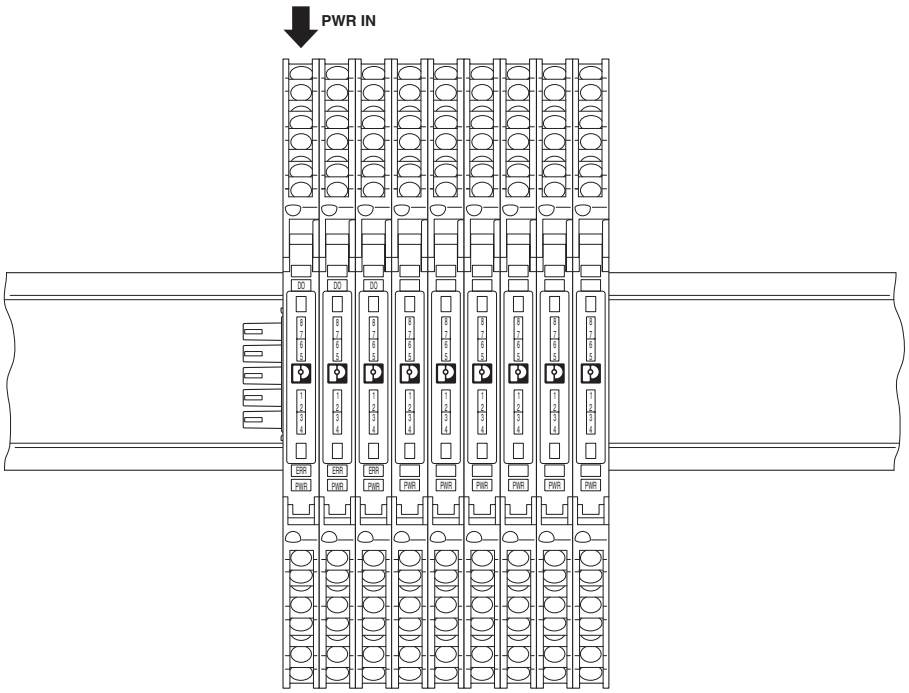
– Direct DC feed-in at any Analog module in the group
– Supply via a power terminal of the same shape
– Supply via any MINI Analog, MINI Analog Pro or MACX Analog power terminal
– Supply via a system power supply with a wide range input of 85 V AC ... 264 V AC

All of the power supply methods for MINI Analog, MINI Analog Pro, and MACX Analog (Ex) modules presented in this manual are compatible with one another. This means, for example, that as long as the marginal conditions presented in the individual sections are met, a MINI MCR-2-PTB power terminal can also be used to supply MACX Analog modules. In addition, if these conditions are met, a combination of different product ranges can be mounted on a DIN rail.

## 2.1 Direct DC supply at any analog module in the group

This method of supply is particularly suitable when you only need to supply a small number of signal conditioners (two to eight) and fault monitoring is not required.

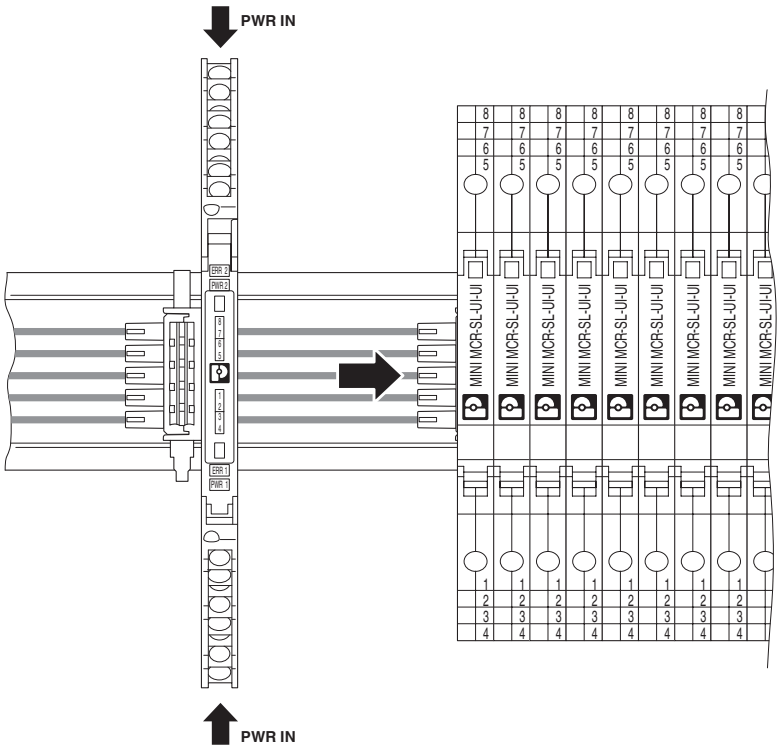
Figure 2-1 Direct supply via any module, e.g., MINI Analog Pro



## 2.2 Supply via any MINI Analog, MINI Analog Pro or MACX Analog power terminal

This version is particularly suitable if a relatively large number of connected signal conditioners is to be used or existing systems are to be extended and, for example, the newer MINI Analog Pro signal conditioners are to be installed in addition to existing MINI Analog signal conditioners, and the use of a power terminal is required. This option also supports fault monitoring.

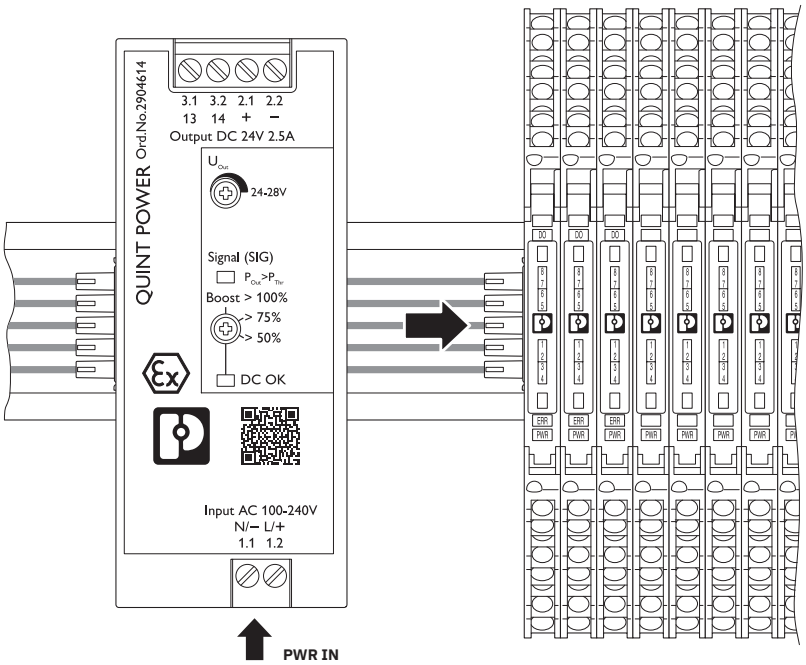
Figure 2-2 Supply via any MINI Analog, MINI Analog Pro or MACX Analog power terminal



## 2.3 Supply via a system power supply with a wide range input of 85 V AC ... 264 V AC

The advantage of this option for supplying the DIN rail connector is that a 24 V DC supply does not have to be available in the control cabinet or control box. For distributed applications in particular, where only 230 V AC is available, this method of supply is the best solution.

Figure 2-3 Supply via a system power supply with a wide range input of 85 V AC ... 264 V AC



# 3 MINI Analog supply options

The MINI Analog signal conditioners require a supply with 24 V DC (19.2 V DC ... 30 V DC). In addition to supplying individual modules via the corresponding terminal blocks on the device, various methods for supplying power to several modules in the MINI Analog product family can be implemented using a DIN rail connector (ME 6,2 TBUS-2 1,5/5-ST-3,81 GN, item no. 2869728 or ME 6,2 TBUS-21,5/5-ST-3,81 KMGY, item no. 2969401). It is supplied with 24 V DC and supplies all connected signal conditioners. This eliminates the need for time-consuming and costly single-core wiring.

When there are only a few modules mounted side by side, the ideal solution is to supply the DIN rail connector directly and therefore the connected modules via a signal conditioner, see Section 3.1 on page 12. One way to supply several modules, with or without short-circuit and cable break detection (see Section 3.4 on page 22), is to use MINI MCR-SL-PTB... devices (see Section 3.2 on page 14). These devices also support redundant supply. If a particularly large number of MINI Analog modules need to be supplied via the DIN rail connector, the MACX MCR-PTB... power and fault signaling module offers sufficient reserves (see Section 4.2 on page 28).

If there is no 24 V DC supply, the QUINT4-SYS-PS/1AC/24DC/2.5/SC system power supply presented in Section 3.3 on page 20 (item no. 2904614) can be used. It is suitable for connection to 230 V AC and is specifically tailored to the requirements of MCR technology (measurement and control). Use in a potentially explosive area is also possible.

**NOTE: Risk of property damage**
Never connect the supply voltage directly to the DIN rail connector.

## 3.1 Direct supply via a MINI Analog signal conditioner

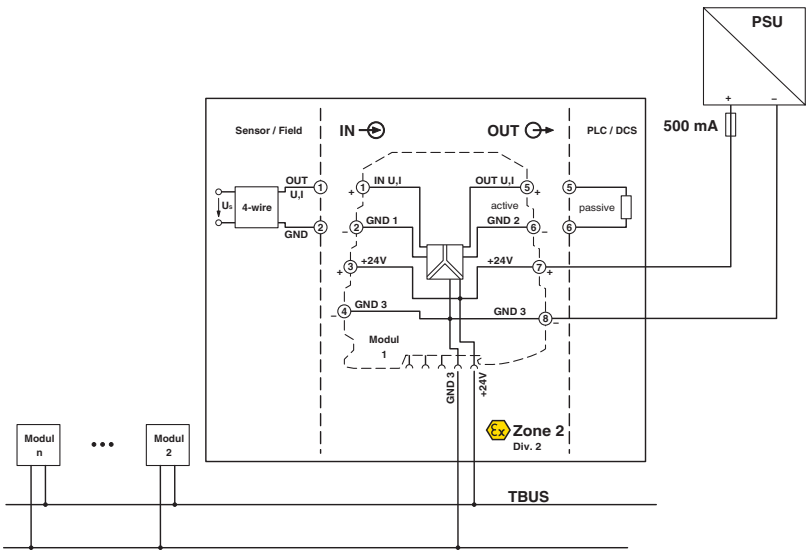
In the case of direct supply, all modules connected to the TBUS DIN rail connector are supplied via the supply at a signal conditioner. Please note that the maximum total current consumption of $I_{max}$ = 400 mA must not be exceeded and the maximum number of modules is therefore restricted to a few devices. For the respective current consumption of the individual signal conditioners, please refer to specifications on the Phoenix Contact homepage, the packing slips or the data sheets. The maximum number of devices can be calculated using the formula below:

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{400\ mA}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

A 500 mA fuse should be connected upstream as protection. In addition, you must make sure that with the 24 V DC supply used the fuse will definitely trip in the event of an error.

Figure 3-1 Direct supply via a MINI Analog signal conditioner




**Example for direct supply via a module**

The goal is to supply five MINI MCR-SL-PT100-UI-200-NC temperature measuring transducers (item no. 2864370) and three configurable MINI MCR-SL-UI-UI-NC signal conditioners (item no. 2864150), with 4 mA ... 20 mA current output at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 21 mA per module and for the configurable transducers it is 19 mA at the desired current output.

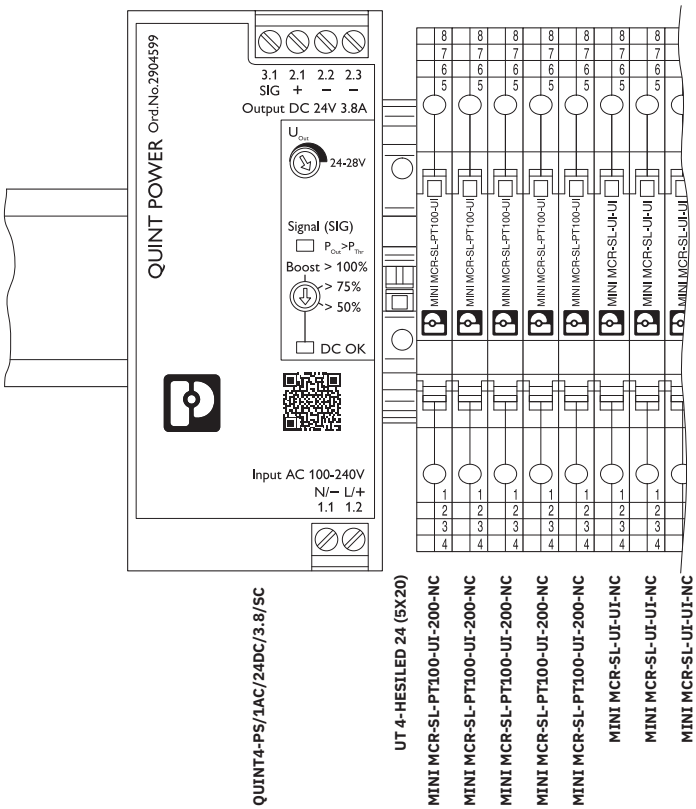
Then determine the maximum total current consumption of all eight modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 5 * 19\ mA + 3 * 21\ mA = 158\ mA < 400\ mA$

The total current consumption of 158 mA is less than the maximum permissible current for supply via a module. The fuse to be connected upstream of the supply signal conditioner should have a nominal current of 500 mA. To ensure that the fuse definitely trips in the event of a short circuit, the 24 V DC supply in this example is provided by a QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 3-2 on page 13. The wiring is as shown in Figure 3-1 on page 12.

Figure 3-2 Example for direct supply via a module




In addition to the low maximum number of modules, another disadvantage of this method of supply is that fault monitoring is not possible. However, this function is provided by the method of supply described in the next section.

## 3.2 Supply via MINI MCR-SL-PTB... power terminals

For supplying power to MINI Analog modules, a particularly suitable method involves MINI MCR-SL-PTB... power terminals. They have the familiar 6.2 mm housing and can be seamlessly integrated into the MINI Analog range. Redundant supply is supported. The decoupling of power supplies used for supply is ensured by the diodes integrated in the module. Moreover, it is possible to extend mechanical redundancy by using two power terminals. A 2.5 A fuse should be used to protect the power terminal(s). It is important to make sure here that tripping is guaranteed in the event of a short circuit by the power supply/supplies used. You can calculate the maximum number of modules, regardless of whether you are using one or two MINI MCR-SL-PTB... modules, with the aid of the product documents using the formula below.

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{2\ A\ (4\ A)}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

**Recommended fuse for power terminal:**
Fuse according to IEC 60127-2/V
Nominal current: 2.5 A
Characteristic: slow-blow
(e.g., Wickmann 5 x 20 mm/No. 195 - glass fuse)

### 3.2.1 Supply via a MINI MCR-SL-PTB... power terminal

In the case of supply via the power terminal, all MINI Analog modules connected via the TBUS DIN rail connector are supplied. Both supply inputs can be supplied by one power supply, see Figure 3-3 on page 15, or redundant supply by means of two different power supplies is implemented, see Figure 3-4 on page 16. It is important here that both supply circuits have separate protection. In this way a maximum current of 2 A can be fed into the DIN rail connector.

Figure 3-3 Supply by means of one power supply

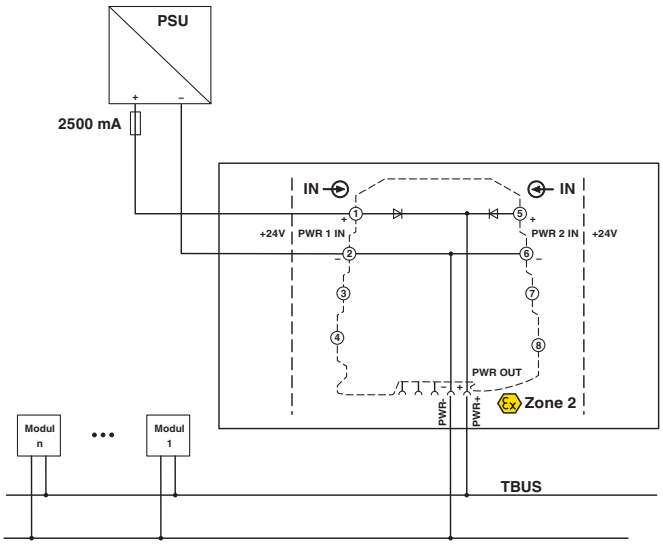
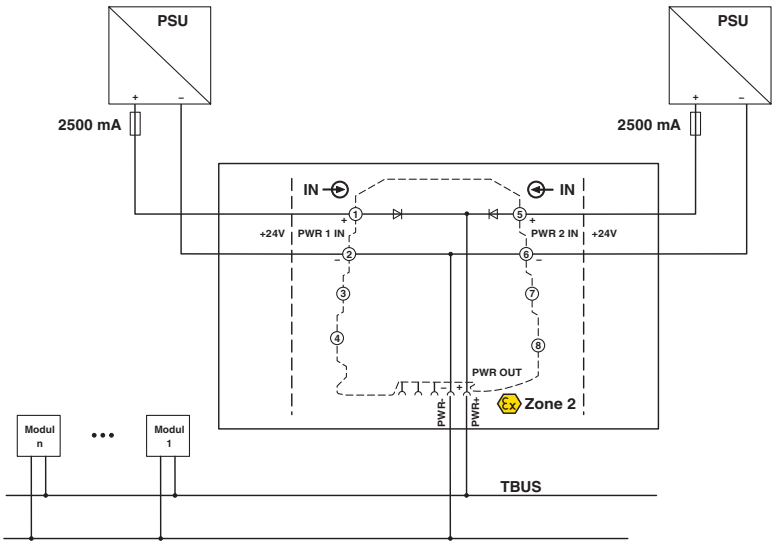


Figure 3-4 Supply by means of redundant power supply




**Example for supply via a MINI MCR-SL-PTB... power terminal**

The goal is to supply 32 MINI MCR-RTD-UI-NC temperature measuring transducers (item no. 2902849), ten configurable MINI MCR-SL-UI-UI-NC signal conditioners (item no. 2864150), with 4 mA ... 20 mA current output and 40 MINI MCR-SL-UI-F frequency converters (item no. 2864082) at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 27 mA per module and for the configurable transducers it is 21 mA at the desired current output. The frequency converters require 10 mA each.

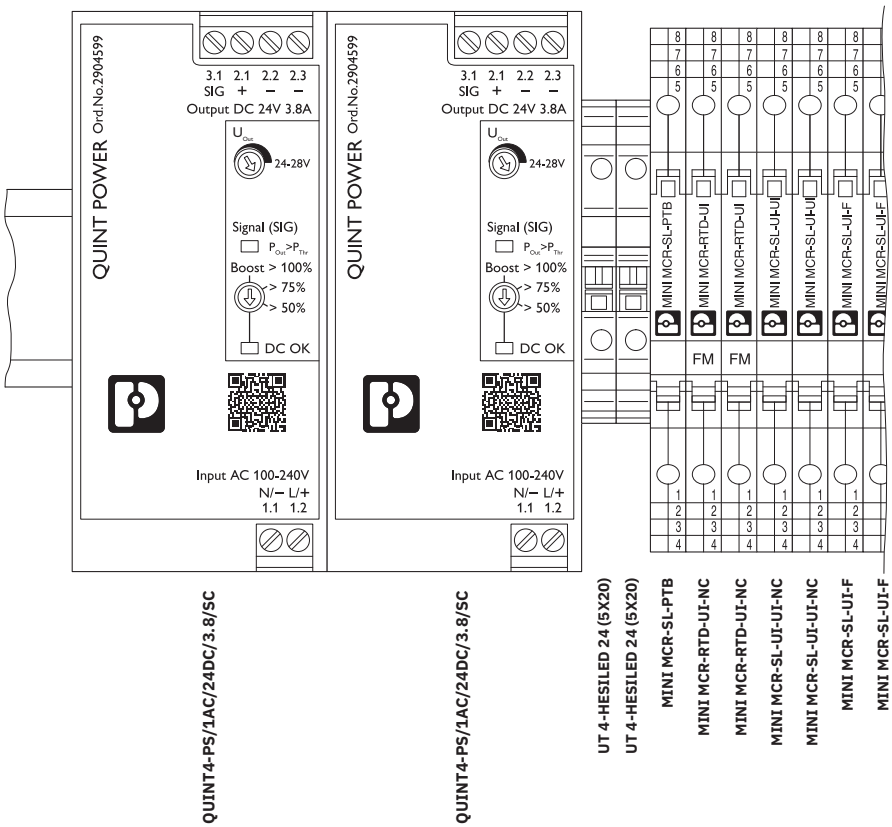
Then determine the maximum total current consumption of all 82 modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 32 * 27\ mA + 10 * 21\ mA + 40 * 10\ mA = 1914\ mA < 2000\ mA$

The total current consumption of 1914 mA is less than the maximum permissible current for supply via the MINI MCR-SL-PTB.... The fuses connected upstream of both power terminals should each have a nominal current of 2.5 A. To ensure that the fuses definitely trip in the event of a short circuit, the 24 V DC supply in this example is provided by a QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 3-5 on page 17. The wiring is as shown in Figure 3-4 on page 16.

Figure 3-5 Example for supply via a MINI MCR-SL-PTB... power terminal

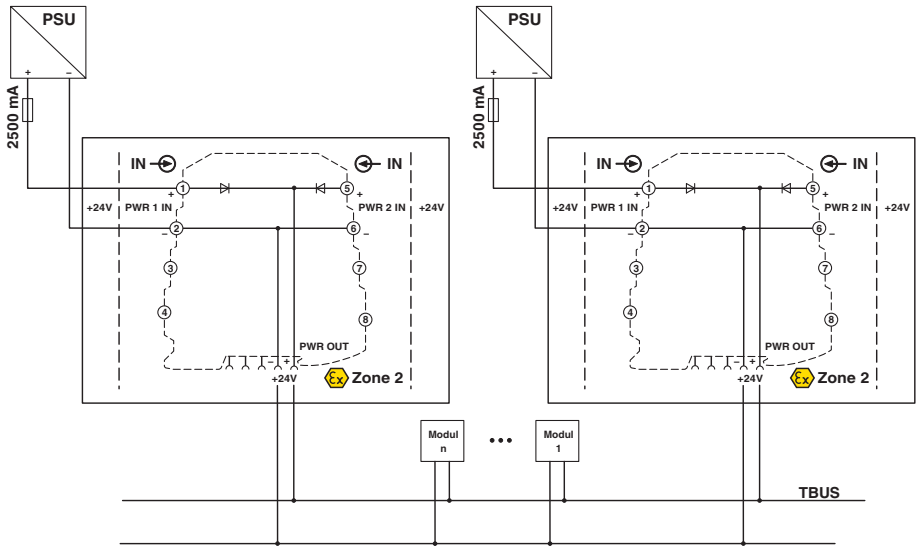



The disadvantage here is that in the event that the power terminal fails, the supply of all signal conditioners is interrupted. However, this can be indicated in this example by means of an N/C contact by using a MINI MCR-SL-FM-RC-NC(-SP) fault signaling module and the MINI MCR-SL-PTB-FM(-SP) power terminal, see Section 3.4 on page 22.

### 3.2.2 Supply via two MINI MCR-SL-PTB... power terminals

If you are using two MINI MCR-SL-PTB... for supplying the connected MINI Analog modules, you are only allowed to connect one power supply per power terminal. Likewise, you should position the two modules at either end of the DIN rail in order to limit the maximum short-circuit current in the event of an error, see Figure 3-6 on page 18. Please also observe the maximum permissible total current here of 2 A if redundant power supply is desired. To increase the total number of signal conditioners, a maximum current of 4 A can be supplied via both power terminals (NOTE, no redundancy). The maximum number of MINI Analog devices is therefore equivalent to the calculation in Section 3.2 on page 14.

Figure 3-6 Supply via two MINI MCR-SL-PTB... power terminals




**Example for the supply via two MINI MCR-SL-PTB... power terminals**

As in the previous example, the goal is to provide a redundant supply to 32 MINI MCR-RTD-UI-NC temperature measuring transducers (item no. 2902849), ten configurable MINI MCR-SL-UI-UI-NC signal conditioners (item no. 2864150), with 4 mA ... 20 mA current output and 40 MINI MCR-SL-UI-F frequency converters (item no. 2864082) at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips again. For the temperature measuring transducers it is 27 mA per module and for the configurable transducers it is 21 mA at the desired current output. The frequency converters require 10 mA each.

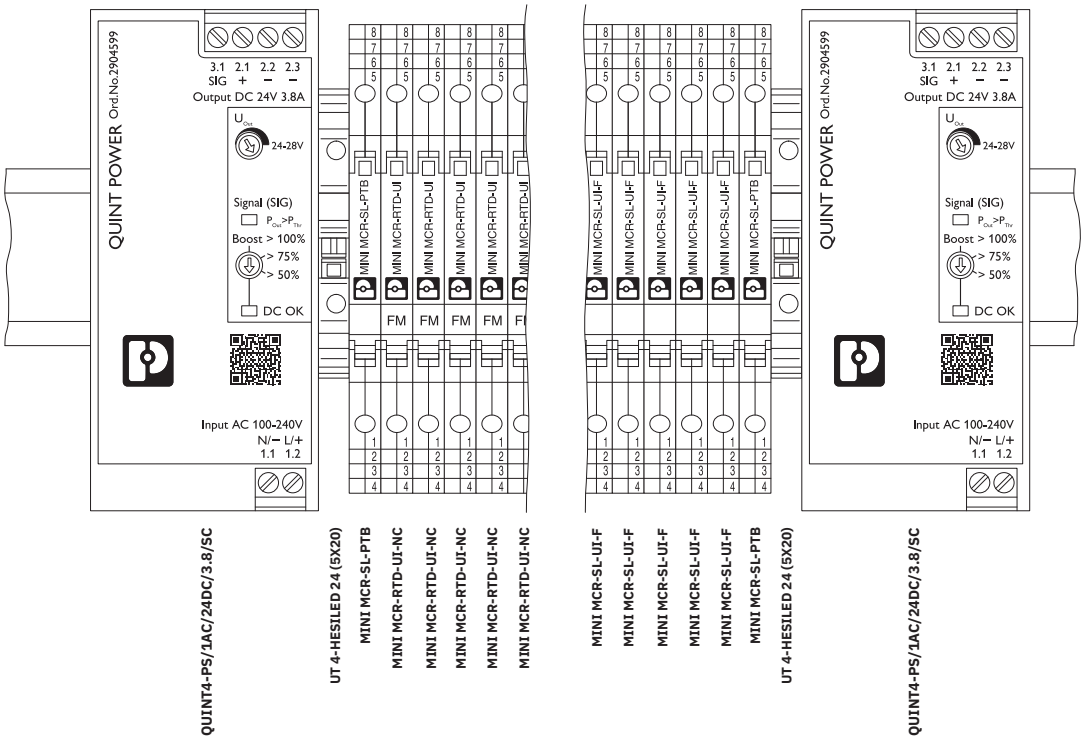
Then determine the maximum total current consumption of all 82 modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 32 * 27\ mA + 10 * 21\ mA + 40 * 10\ mA = 1914\ mA < 2000\ mA$

The total current consumption of 1914 mA is less than the maximum permissible current for supply via the MINI MCR-SL-PTB.... The fuses connected upstream of both power terminals should each have a nominal current of 2.5 A. In order to ensure the guaranteed tripping of the fuses in the event of a short circuit, the supply with 24 V DC in this example is provided by two QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 3-7 on page 19. The wiring is as shown in Figure 3-6 on page 18.

Figure 3-7 Example for the supply via two MINI MCR-SL-PTB... power terminals




The failure of either or both of the power terminals can be indicated by means of an N/C contact by using a MINI MCR-SL-FM-RC-NC(-SP) fault signaling module and the MINI MCR-SL-PTB-FM(-SP) power terminals.

## 3.3 Supply via a system power supply

If there is no 24 V DC supply in the control cabinet or in the terminal box for supplying the MINI Analog signal conditioners, you can use a QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614). These power supplies, which have been developed specifically for measurement and control technology, enable the signal conditioners to be supplied directly from a 230 V AC supply via the TBUS DIN rail connector. These power supplies are simply snapped onto the TBUS and deliver a maximum current of 2.5 A. To increase performance, up to two QUINT4-SYS-PS/1AC/24DC/2.5/SC can also be snapped on. This means that a total current of 5 A can be supplied. Please note, however, that redundant supply is not possible for currents greater than 2.5 A. A 6 A, 10 A or 16 A characteristic B miniature circuit breaker should be used to protect the primary side.

Calculate the maximum number of modules with the aid of the relevant packing slips using the formula below.

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{1{,}5\ A\ (3\ A)}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

**Example for supply via a system power supply**

The goal is to supply 65 MINI MCR-SL-PT100-UI-200-NC temperature measuring transducers (item no. 2864370).

First determine the current consumption of the modules from the packing slips. For this temperature measuring transducer it is 21 mA per module.

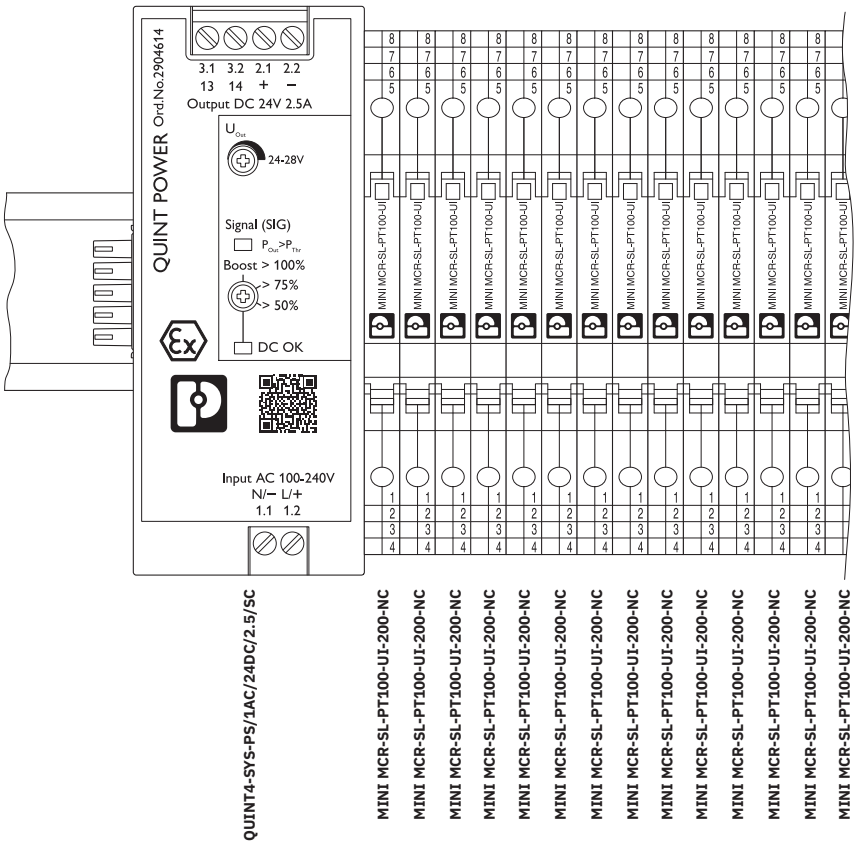
Then determine the maximum total current consumption of all 65 modules.

$$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

$$I = 65 * 21\ mA = 1365\ mA < 1500\ mA$$

The total current consumption of 1365 mA is less than the maximum permissible current for supply via the QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614). The structure is shown in Figure 3-8 on page 21.

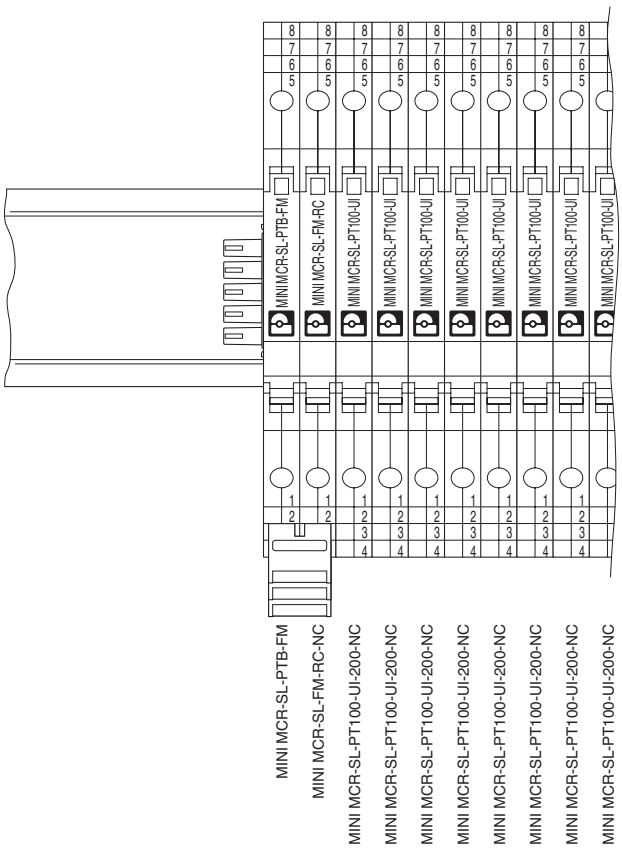
Figure 3-8 Supply via a system power supply



## 3.4 Monitoring the supply voltage using MINI MCR-SL-FM-RC... fault signaling modules

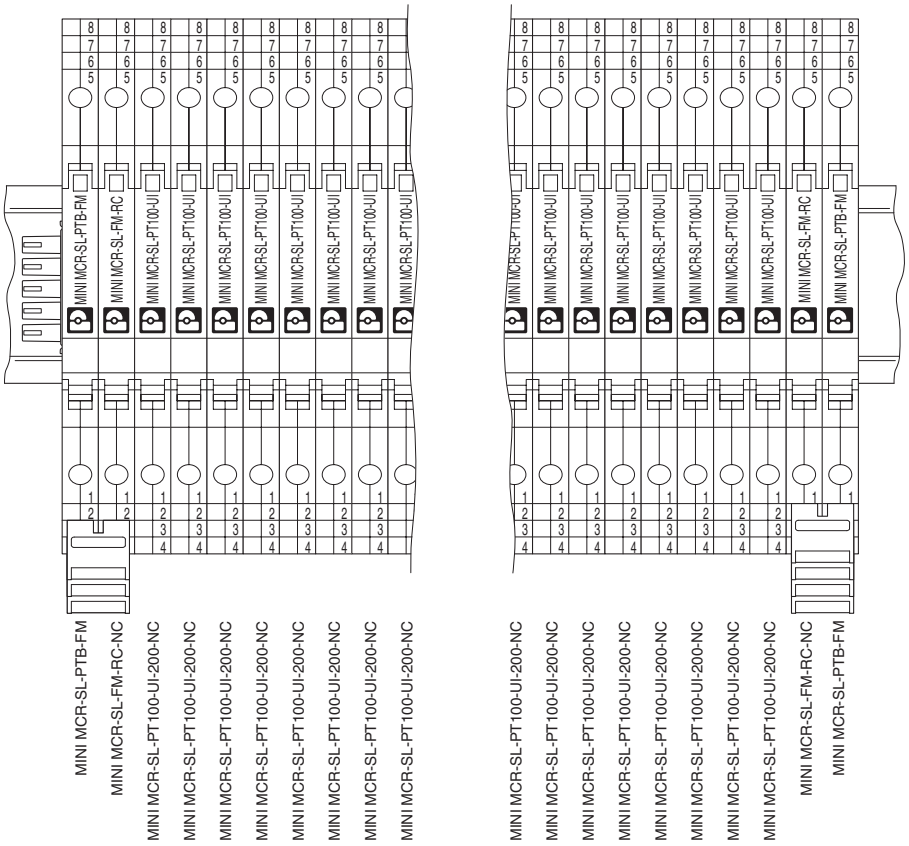
As described in Section 3.2 on page 14, the MINI Analog modules can be supplied with power via a MINI MCR-SL-PTB power terminal. If the MINI MCR-SL-PTB-FM... modules (item no. 2864134) and the MINI MCR-SL-FM-RC... error message modules (item no. 2902961) are used, it is possible to establish redundant monitoring of the supply voltage. Mount a power terminal and a fault signaling module of the same shape side by side without spacing, see Figure 3-9 on page 22.

Figure 3-9 Redundancy monitoring of the supply voltage




Then bridge terminal blocks 1 to 4 of the power terminal with terminals 1 to 4 of the fault signaling module. Use the FBSR 2-6 plug-in bridges supplied with the fault signaling module (plug-in bridge item no. 3033715) or normal cables. Now if one of the power supplies fails, this is indicated via an N/C contact. For additional mechanical redundancy, as shown in Section 3.2.2 on page 18, two power terminals and two fault signaling modules can be used, see Figure 3-10 on page 23. Again only one supply may be connected to each power terminal here. In the second fault signaling module, fault monitoring of external measuring transducers must be deactivated because evaluation can only take place via one module in a group.

Figure 3-10 Additional mechanical redundancy



# 4 Supply options for MINI Analog Pro

MINI Analog Pro signal conditioners require a DC supply in the range from 9.6 V ... 30 V. The MINI Analog Pro versions with intrinsic safety and functional safety require a DC supply in the range between 19.2 V ... 30 V. In addition to supplying individual modules via the corresponding terminal blocks on the device, various methods for supplying power to several modules in the MINI Analog Pro product family can be implemented using the ME 6,2 TBUS-2 1,5/5-ST-3,81 GY DIN rail connector (item no. 2695439). It supplies all connected signal conditioners. This eliminates the need for time-consuming and costly single-core wiring.

When there are only a small number of modules mounted side by side, the ideal solution is to supply the DIN rail connector directly and therefore the connected modules via a signal conditioner, see Section 4.1 on page 26. One way to supply several modules, with additional monitoring for module errors and the supply (see Section 4.4 on page 36), is to use MINI MCR-2-PTB... devices (see Section 4.2 on page 28). These devices also support redundant supply.

If the DC supply is not present in the range between 9.6 V ... 30 V, the QUINT4-SYS-PS/1AC/24DC/2.5/SC system power supply presented in Section 4.3 on page 34 (item no. 2904614) can be used. It is suitable for connection to 230 V AC and is specifically tailored to the requirements of measurement and control technology. Use in a potentially explosive area is also possible.

**NOTE: Risk of property damage**
Never connect the supply voltage directly to the DIN rail connector.

## 4.1 Direct supply via a MINI Analog Pro signal conditioner

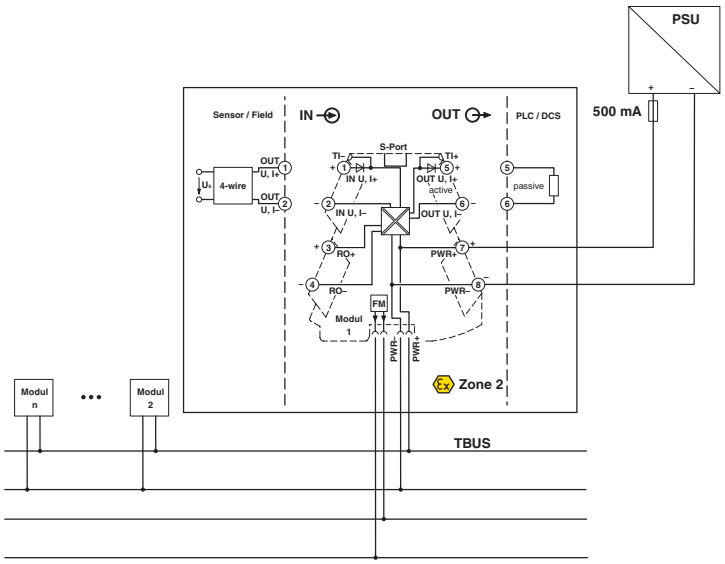
In the case of direct supply, all modules connected to the TBUS DIN rail connector are supplied via the supply at a signal conditioner. Please note that the maximum total current consumption of $I_{max}$ = 400 mA must not be exceeded and the maximum number of modules is therefore restricted to a few devices. For the respective current consumption of the individual signal conditioners, please refer to specifications on the Phoenix Contact homepage, in the packing slips or the data sheets. The maximum number of devices can be calculated using the formula below:

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{400\ mA}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

A 500 mA fuse should be connected upstream as protection. In addition, you must make sure that with the 24 V DC supply used the fuse will definitely trip in the event of an error.

Figure 4-1 Direct supply via a MINI Analog Pro signal conditioner




**Example for direct supply via a module**

The goal is to supply five MINI MCR-2-TC-UI temperature measuring transducers (item no. 2902055) and three configurable MINI MCR-2-UI-UI signal conditioners (item no. 2902037), with 4 mA ... 20 mA current output, at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 31.5 mA per module and for the configurable transducers it is 25 mA at the desired current output.

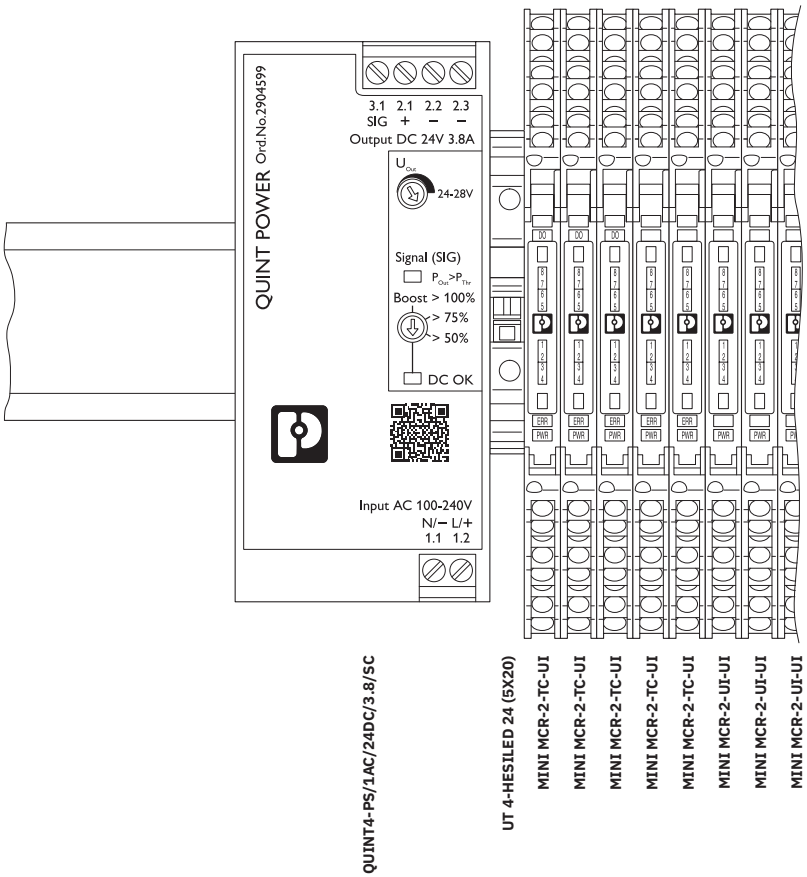
Then determine the maximum total current consumption of all eight modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 5 * 31{,}5\ mA + 3 * 25\ mA = 201\ mA < 400\ mA$

The total current consumption of 201 mA is less than the maximum permissible current for supply via a module. The fuse to be connected upstream of the supply signal conditioner should have a nominal current of 500 mA. To ensure that the fuse definitely trips in the event of a short circuit, the 24 V DC supply in this example is provided by a QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 4-2 on page 27. The wiring is as shown in Figure 4-1 on page 26.

Figure 4-2 Example for direct supply via a module




In addition to the low maximum number of modules, a disadvantage of this method of supply is that fault monitoring is not possible. However, this function is provided by the method of supply described in the next section.

## 4.2 Supply via MINI MCR-2-PTB... power terminal

MINI MCR-2-PTB... power terminals are particularly suitable for supplying power to MINI Analog Pro modules. They have the familiar 6.2 mm housing and can be seamlessly integrated into the MINI Analog Pro range. Redundant supply is supported. The decoupling of power supplies used for supply is ensured by the diodes integrated in the module. Moreover, it is possible to extend mechanical redundancy by using two power terminals. A 4 A fuse should be used to protect the power terminal(s). It is important to make sure here that tripping is guaranteed in the event of a short circuit by the power supply/supplies used. You can calculate the maximum number of modules, regardless of whether you are using one or two MINI MCR-2-PTB... modules, with the aid of the product documents using the formula below.

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{3{,}2\ A}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

**Recommended fuse for power terminal:**
Fuse according to IEC 60127-2/V
Nominal current: 2.5 A
Characteristic: slow-blow
(e.g., Wickmann 5 x 20 mm/No. 195 - glass fuse)

### 4.2.1 MINI MCR-2-PTB... power terminal in combination with intrinsically safe MINI Analog Pro versions

For direct connection of the MINI MCR-2-PTB... power terminal to the intrinsically safe and functionally safe versions of the MINI Analog Pro product family, plug the blind plug provided with the MINI MCR-2-PTB... power terminal into connector position 4 (terminal points 1/2 and 3/4) and 5 of the module. Thus, direct connection is possible.

### 4.2.2 Supply via a MINI MCR-2-PTB... power terminal

In the case of supply via the power terminal, all MINI Analog Pro modules connected via the TBUS DIN rail connector are supplied. Both supply inputs can be supplied by one power supply, see Figure 4-3 on page 29, or redundant supply by means of two different power supplies is implemented, see Figure 4-4 on page 29. It is important here that both supply circuits have separate protection. In this way, a maximum current of 3.2 A can be fed into the DIN rail connector.

For intrinsically safe and functionally safe MINI Analog Pro versions, you must observe Section 4.2.1.

Figure 4-3 Supply by means of one power supply

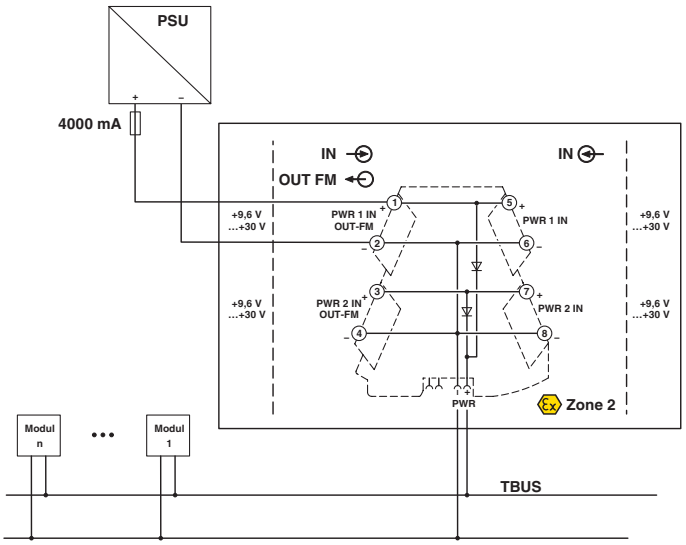
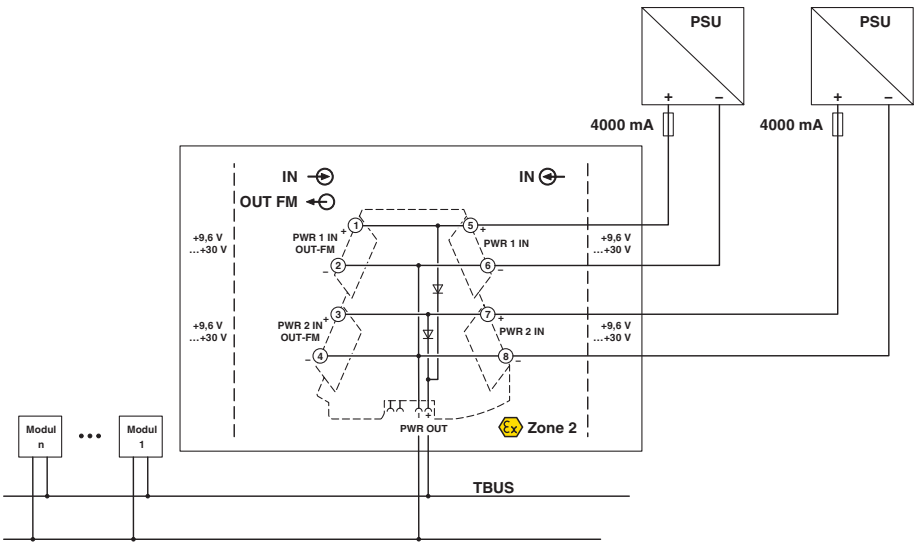



Figure 4-4 Supply by means of redundant power supplies



**Example for supply via a MINI MCR-2-PTB... power terminal**

The goal is to supply 32 MINI MCR-2-RTD-UI temperature measuring transducers (item no. 2902049), ten configurable MINI MCR-2-UI-UI signal conditioners (item no. 2902037), with 4 mA ... 20 mA current output and 40 universal MINI MCR-2-UNI-UI-UIRO signal conditioners with switching output (item no. 2902026) at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 31.5 mA per module and for the configurable transducers it is 25 mA at the desired current output. The universal signal conditioners with switching output require 31.5 mA each.

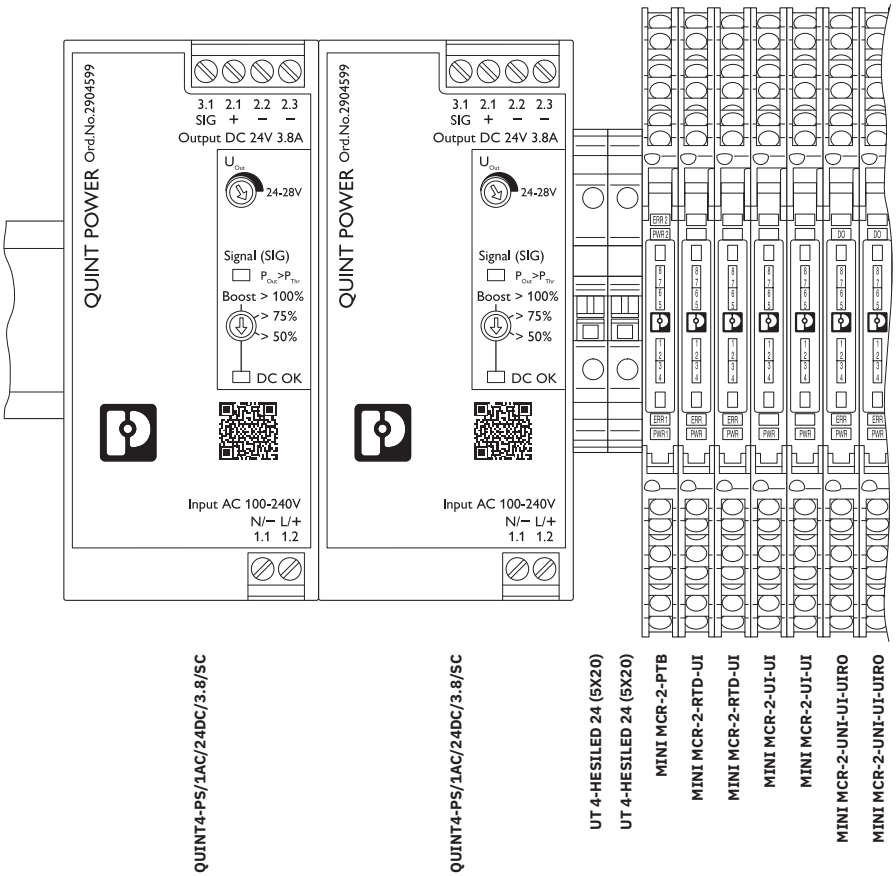
Then determine the maximum total current consumption of all 82 modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 32 * 31{,}5\ mA + 10 * 25\ mA + 40 * 31{,}5\ mA = 2518\ mA < 3200\ mA$

The total current consumption of 2518 mA is less than the maximum permissible current for supply via the MINI MCR-2-PTB.... The fuses connected upstream of both power modules should each have a nominal current of 4000 mA. To ensure that the fuses definitely trip in the event of a short circuit, the 24 V DC supply in this example is provided by a QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 4-5 on page 31. The wiring is as shown in Figure 4-4 on page 29.

Figure 4-5 Example for supply via a MINI MCR-2-PTB... power terminal

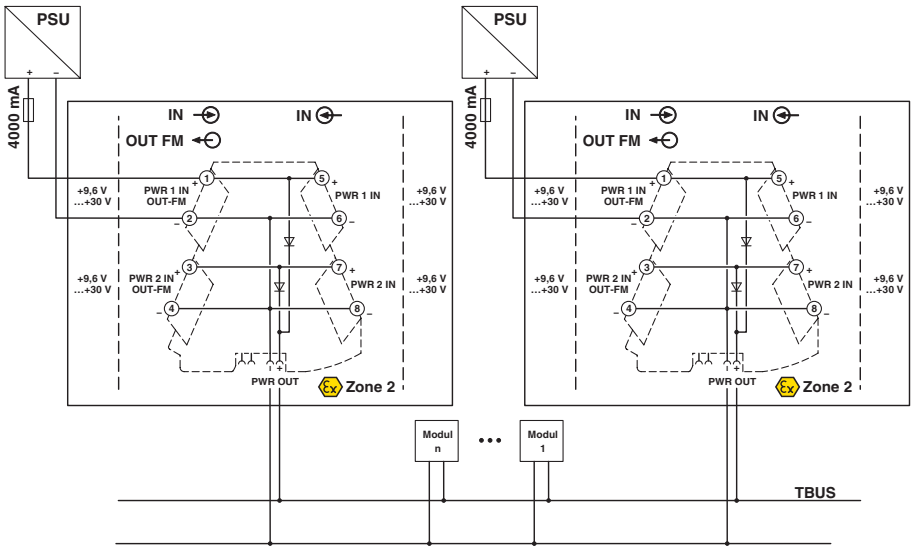



The disadvantage here is that in the event that the power terminal fails, the supply of all signal conditioners is interrupted. However, this can be indicated in this example by means of an N/C contact by using a MINI MCR-2-FM-RC fault signaling module and the MINI MCR-2-PTB power terminal.

### 4.2.3 Supply via two MINI MCR-2-PTB... power terminals

If you are using two MINI MCR-2-PTB... to supply the connected MINI Analog modules, only one power supply may be connected per power terminal. Likewise, you should position the two modules at either end of the DIN rail in order to limit the maximum short-circuit current in the event of an error, see Figure 4-6 on page 32. Please also observe the maximum permissible total current here of 3.2 A if redundant power supply is desired. To increase the total number of signal conditioners, a maximum current of 6 A can be supplied via both power terminals (NOTE, no redundancy). The maximum number of MINI Analog Pro devices is therefore equivalent to the calculation in Section 4.2 on page 28.

Figure 4-6 Supply via two MINI MCR-2-PTB... power terminals




For intrinsically safe and functionally safe MINI Analog Pro versions, you must observe Section 4.2.1.

**Example for the supply via two MINI MCR-2-PTB... power terminals**

The goal is to provide a redundant supply to 16 MINI MCR-2-RTD-UI temperature measuring transducers (item no. 2902049), ten configurable MINI MCR-2-UI-UI signal conditioners (item no. 2902037), with 4 mA ... 20 mA current output and 25 universal MINI MCR-2-UNI-UI-UIRO signal conditioners with switching output (item no. 2902026). Only an operating voltage of 12 V DC is available in this example.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 62.50 mA per module and for the configurable transducers it is 54 mA at the desired current output. The universal signal conditioners with switching output require 62.50 mA each.

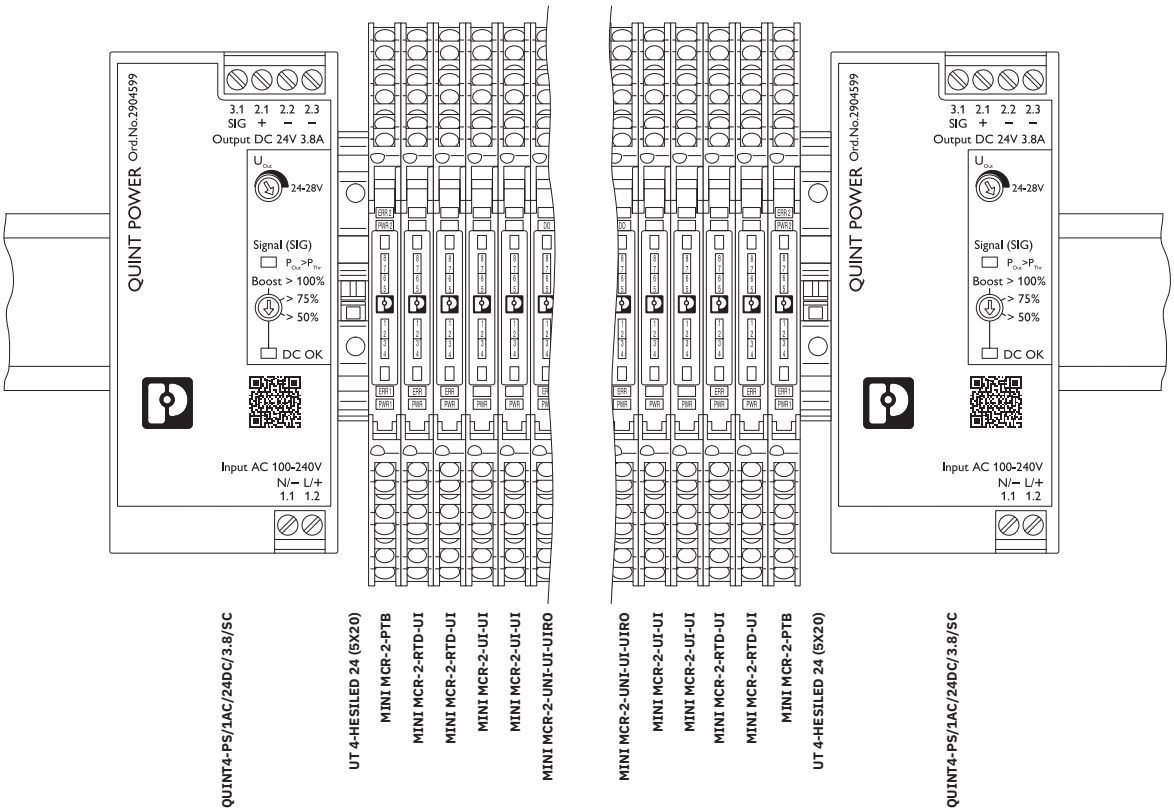
Then determine the maximum total current consumption of all 51 modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 16 * 62{,}5\ mA + 10 * 54\ mA + 25 * 62{,}5\ mA = 3102{,}5\ mA < 3200\ mA$

The total current consumption of 3102.5 mA is less than the maximum permissible current for supply via the MINI MCR-2-PTB.... The fuses connected upstream of both power terminals should each have a nominal current of 4000 mA. In order to ensure the guaranteed tripping of the fuses in the event of a short circuit, the 12 V DC supply is implemented by two QUINT4-PS/1AC/24DC/3.8/SC power supplies in this example (item no. 2904599), which provide a short-circuit current of 90 A. The structure is shown in Figure 4-7 on page 33. The wiring is as shown in Figure 4-6 on page 32.

Figure 4-7 Example for the supply via two MINI MCR-2-PTB... power terminals




The disadvantage here is that in the event that the power terminal fails, the supply of all signal conditioners is interrupted. However, this can be indicated in this example by means of an N/C contact by using a MINI MCR-2-FM-RC fault signaling module and the MINI MCR-2-PTB power terminal.

## 4.3 Supply via system power supply

If there is no 24 V DC supply in the control cabinet or in the terminal box for supplying the MINI Analog Pro signal conditioners, you can use a QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614). These power supplies, which have been developed specifically for measurement and control technology, enable the signal conditioners to be supplied directly from a 230 V AC supply via the TBUS DIN rail connector. These power supplies are simply snapped onto the TBUS and deliver a maximum current of 2.5 A. To increase performance, up to two QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614) can be snapped on. This means that a total current of 5 A can be supplied. Please note, however, that redundant supply is not possible for currents greater than 2.5 A. A 6 A, 10 A or 16 A characteristic B miniature circuit breaker should be used to protect the primary side.

Calculate the maximum number of modules with the aid of the relevant packing slips using the formula below.

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{1{,}5\ A\ (3\ A)}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

The goal is to supply 40 MINI MCR-2-TC-UI temperature measuring transducers (item no. 2902055).

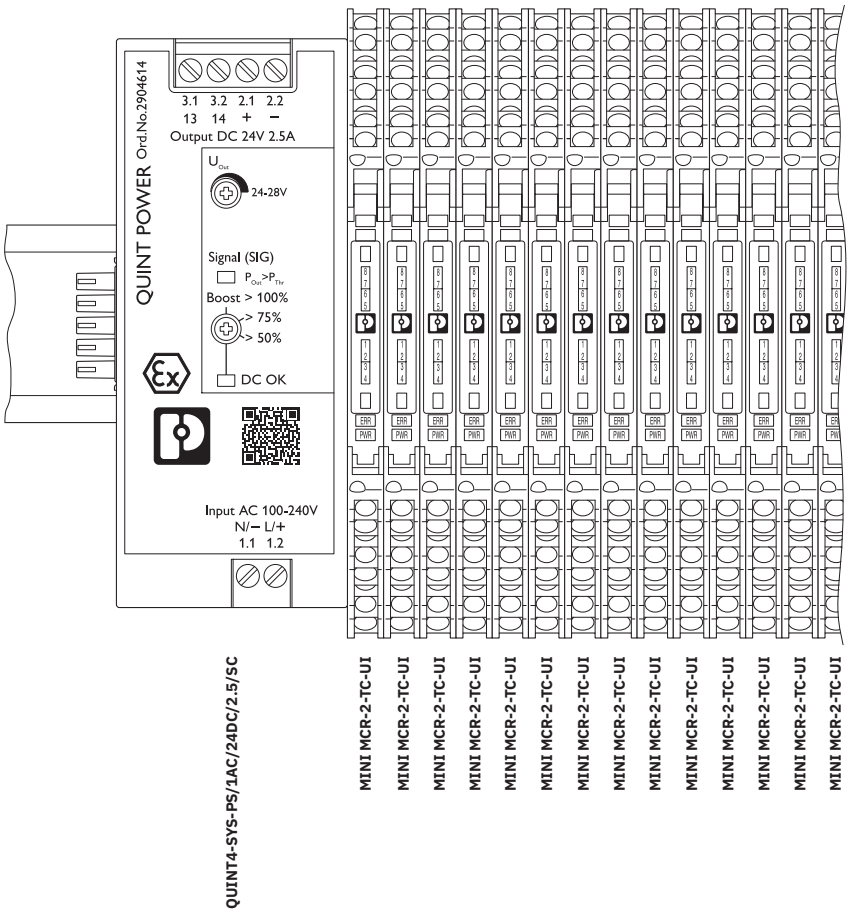
First determine the current consumption of the modules from the packing slips. For this temperature measuring transducer it is 32.5 mA per module.

Then determine the maximum total current consumption of the 40 modules.
$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$

$I = 40 * 32{,}5\ mA = 1300\ mA < 1500\ mA$

The total current consumption of 1300 mA is less than the maximum permissible current for supply via the QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614). The structure is shown in Figure 4-8 on page 35.

Figure 4-8 Supply via system power supply.




**DANGER: Explosion hazard**

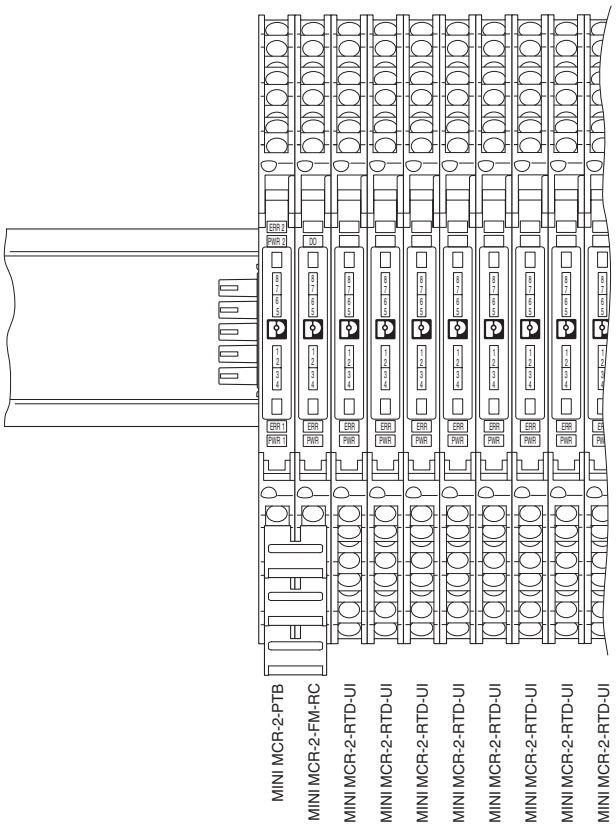
You must observe a 50 mm clearance between the intrinsically safe versions of the MINI Analog Pro product family and the system power supply.

Alternatively, you can install the MCR-DP partition plate (item no. 1430594) between the system power supply and the intrinsically safe versions of the MINI Analog Pro product family. The system power supply can thus be positioned directly adjacent.

## 4.4 Monitoring the supply voltage using MINI MCR-2-FM-RC-... fault signaling modules

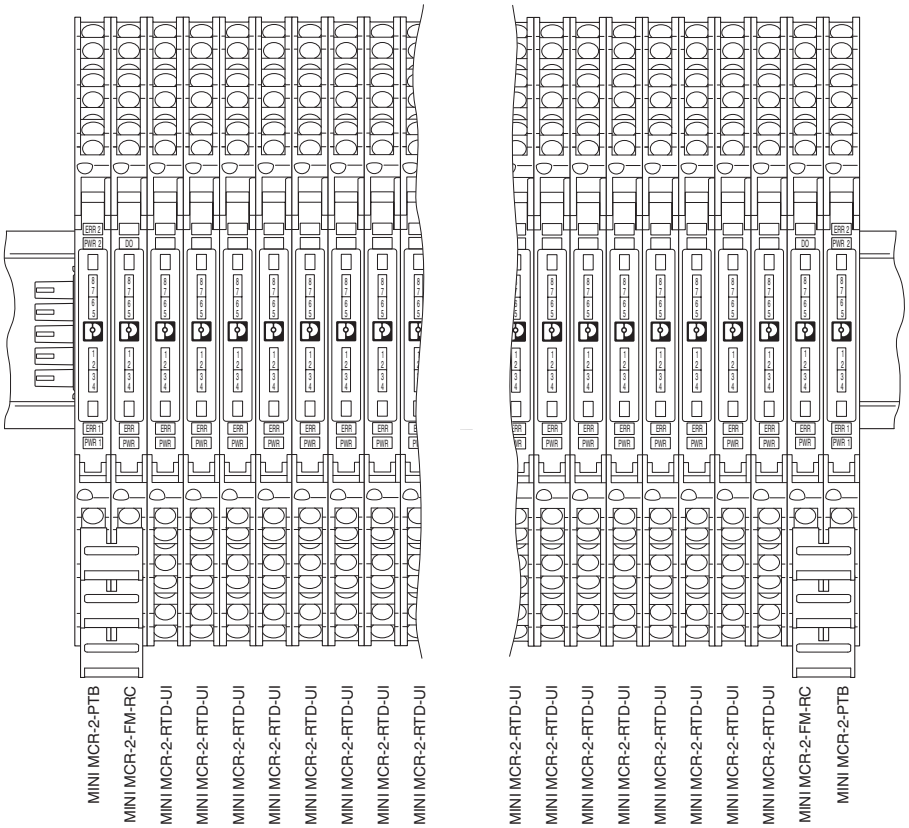
As described in Section 4.2 on page 28, the MINI Analog Pro modules can be supplied with power via a MINI MCR-2-PTB... power terminal (item no. 2902066). By using the MINI MCR-2-FM-RC-... fault signaling modules (item no. 2904504), it is then possible to establish redundancy monitoring of the supply voltage. Mount a power terminal and a fault signaling module of the same shape side by side without spacing, see Figure 4-9 on page 36.

Figure 4-9 Redundancy monitoring of the supply voltage




Then bridge terminal blocks 1 to 4 of the power terminal with terminals 1 to 4 of the fault signaling module. Use the FBSR 2-6 plug-in bridges supplied with the fault signaling module (plug-in bridge item no. 3033715) or normal cables. Now if one of the power supplies fails, this is indicated via an N/C contact. For additional mechanical redundancy, as shown in Section 4.2.3 on page 32, two power terminals and two fault signaling modules can be used, see Figure 4-10 on page 37. Again only one supply may be connected to each power terminal here. In the second fault signaling module, fault monitoring of external measuring transducers must be deactivated because evaluation can only take place via one module in a group.

Figure 4-10 Additional mechanical redundancy




**DANGER: Explosion hazard**

You must observe a 50 mm clearance between the intrinsically safe versions of the MINI Analog Pro product family and the system power supply.

Alternatively, you can install the MCR-DP partition plate (item no. 1430594) between the system power supply and the intrinsically safe versions of the MINI Analog Pro product family. The system power supply can thus be positioned directly adjacent.

## 4.5 Using the MINI MCR-2-V8... gateways

If you are using a MINI Analog Pro gateway V8 (MINI MCR-2-V8...), it is supplied via the MINI Analog Pro signal conditioner. This means that you have to take the current consumption of the gateway into consideration in every calculation. To illustrate this, “Example for direct supply via a module” on page 38 is repeated with the MINI MCR-2-V8-MOD-TCP module connected.

**Example for direct supply via a module**

The goal is to supply five MINI MCR-2-TC-UI-2-TC-UI temperature measuring transducers (item no. 2902055), three configurable MINI MCR-2-UI-UI signal conditioners (item no. 2902037) and also the MINI MCR-2-V8-MOD-TCP module (item no. 2905635), with 4 mA ... 20 mA current output, at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 31.5 mA per module and for the configurable transducers it is 25 mA at the desired current output. For the Modbus/TCP gateway it is 24 V 50 mA.

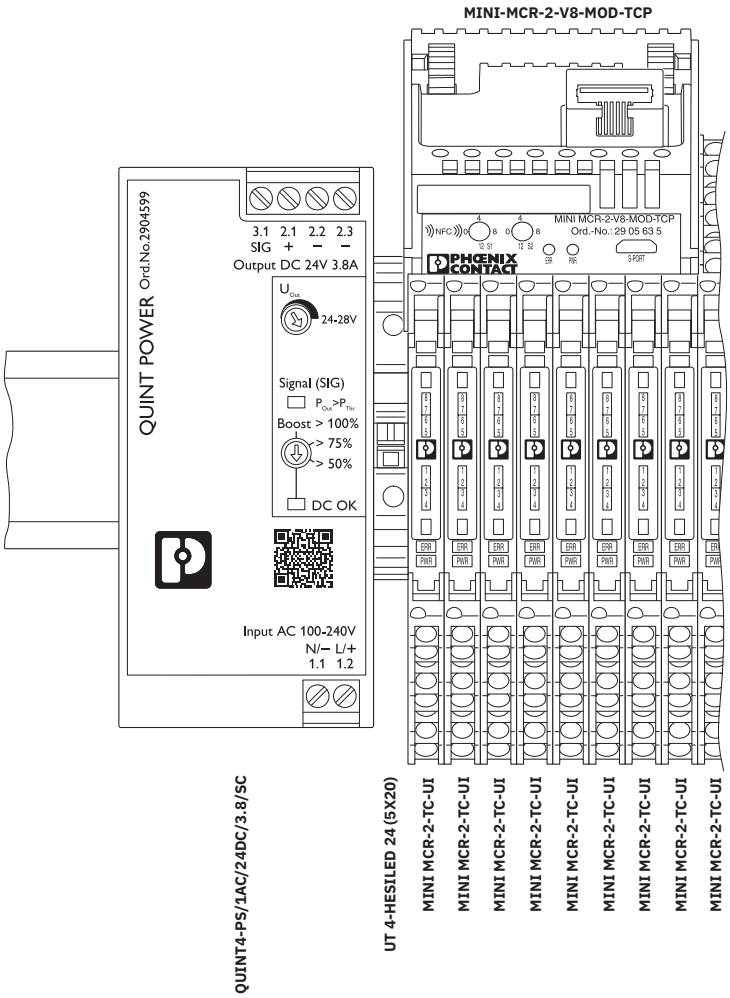
Then determine the maximum total current consumption of all nine modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 5 * 31{,}5\ mA + 3 * 25\ mA + 1 * 50\ mA = 282\ mA < 400\ mA$

The total current consumption of 331 mA is less than the maximum permissible current for supply via a module. The fuse to be connected upstream of the supply signal conditioner should have a nominal current of 500 mA. To ensure that the fuse definitely trips in the event of a short circuit, the 24 V DC supply in this example is provided by a QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 4-11 on page 39. The wiring is as shown in Figure 4-1 on page 26.

Figure 4-11 Example for direct supply via a module




In addition to the low maximum number of modules, a disadvantage of this method of supply is that fault monitoring is not possible. However, this function is provided by the method of supply described in the next section.

**DANGER: Explosion hazard**

You must observe a 50 mm clearance between the intrinsically safe versions of the MINI Analog Pro product family and the system power supply.

Alternatively, you can install the MCR-DP partition plate (item no. 1430594) between the system power supply and the intrinsically safe versions of the MINI Analog Pro product family. The system power supply can thus be positioned directly adjacent.

# 5 Supply options for MACX Analog

MACX Analog (Ex) signal conditioners, which are compatible with the DIN rail connector, require a 24 V DC supply. MACX Analog (Ex) modules are also available with an extended supply voltage range of 24 V ... 230 V AC/DC. However, these modules are only ever supplied individually via the terminal blocks on the device and are not suitable for supply by means of the TBUS DIN rail connector. When supplying individual devices directly via the terminal blocks, various methods for supplying power to several modules in the MACX Analog (Ex) product family can be implemented using the DIN rail connector (ME 6,2 TBUS-2 1,5/5-ST-3,81KMGY, item no. 2969401). It is supplied with 24 V DC and supplies all connected signal conditioners. This eliminates the need for time-consuming and costly single-core wiring.

When there are only a few modules mounted side by side, the ideal solution is to supply the DIN rail connector directly and therefore the connected modules via a signal conditioner, see Section 5.1 on page 42. One way to supply several modules, with short-circuit and cable break detection, is to use MACX MCR-PTB... or TC-MACX-MCR-PTB devices, see Section 5.2 on page 44. These devices also support redundant supply.

If there is no 24 V DC supply, the system power supply presented in Section 5.4 on page 51, QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614) can be used. It is suitable for connection to 230 V AC and is specifically tailored to the requirements of measurement and control technology. Use in potentially explosive areas is also possible.

**NOTE: Risk of property damage**
Never connect the supply voltage directly to the DIN rail connector.

## 5.1 Direct supply via a MACX MCR(-EX) signal conditioner

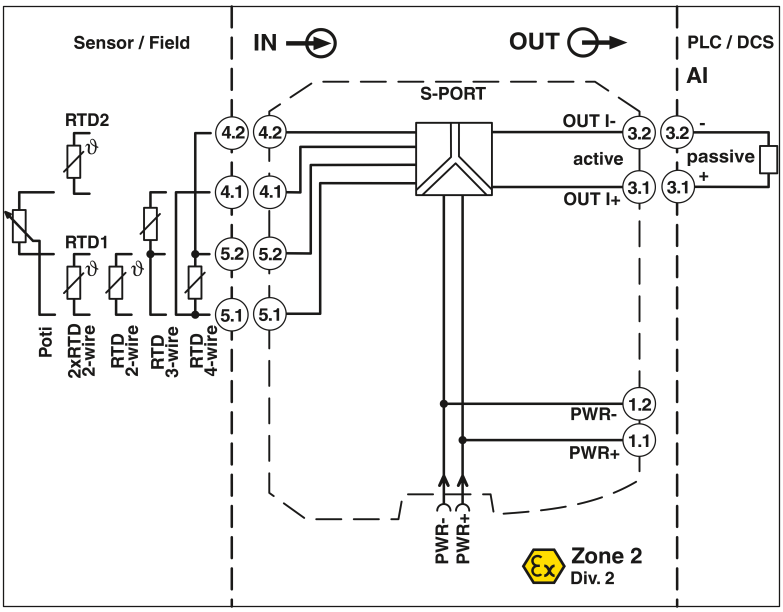
In the case of direct supply, all modules connected to the TBUS DIN rail connector are supplied via the supply at a signal conditioner. Please note that the maximum total current consumption of $I_{max}$ = 400 mA must not be exceeded and the maximum number of modules is therefore restricted to a few devices. For the respective current consumption of the individual signal conditioners, please refer to specifications on the Phoenix Contact homepage, in the packing slips or the data sheets. The maximum number of devices can be calculated using the formula below:

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{400\ mA}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

A 500 mA fuse should be connected upstream as protection. In addition, you must make sure that with the 24 V DC supply used the fuse will definitely trip in the event of an error.

Figure 5-1 Direct supply via a module




**Example for direct supply via a module**

The goal is to supply five MACX MCR-RTD-I temperature measuring transducers (item no. 1050201) and three NAMUR signal conditioners MACX MCR-SL-NAM-R (item no. 2865997) at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducers it is 40 mA per module and for the NAMUR signal conditioners it is 21 mA at the desired current output.

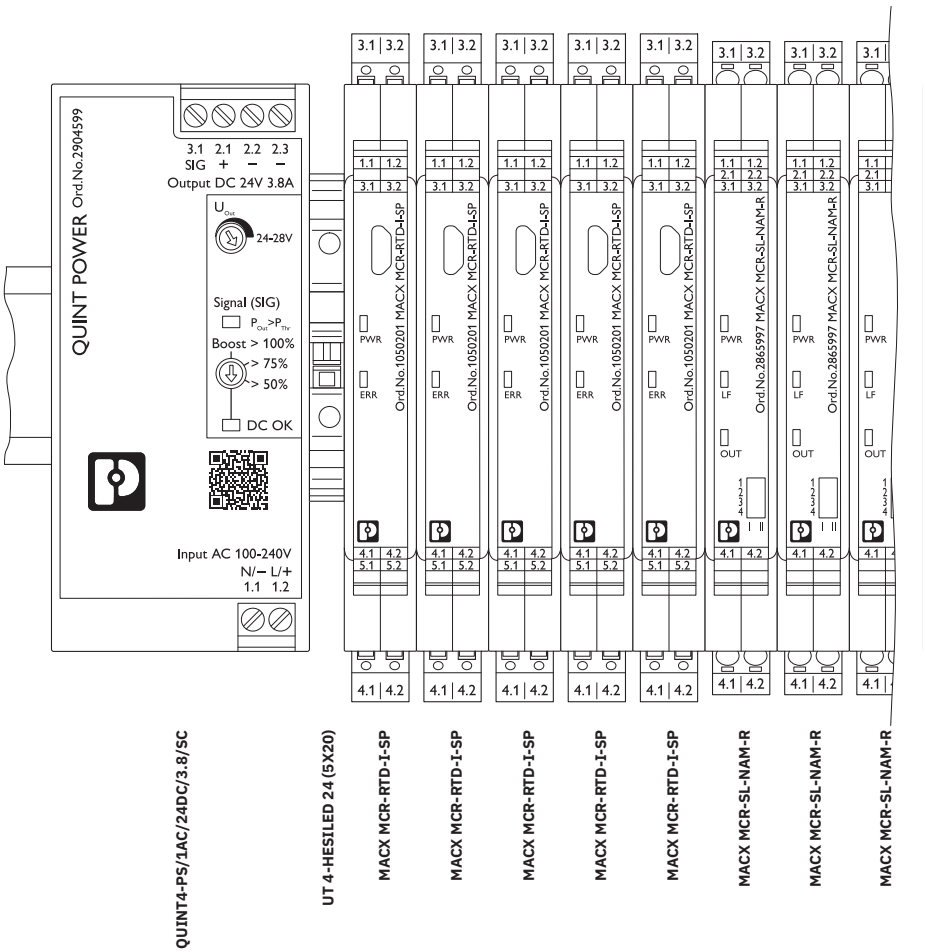
Then determine the maximum total current consumption of all eight modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$

$I = 5 * 40\ mA + 3 * 21\ mA = 263\ mA < 400\ mA$

The total current consumption of 263 mA is less than the maximum permissible current for supply via a module. The fuse to be connected upstream of the supply signal conditioner should have a nominal current of 500 mA. To ensure that the fuse definitely trips in the event of a short circuit, the 24 V DC supply in this example is provided by a QUINT4-PS/1AC/24DC/3.8/SC (item no. 2904599). The structure is shown in Figure 5-2 on page 43. The wiring is as shown in Figure 5-1 on page 42.

Figure 5-2 Example for direct supply via a module




In addition to the low maximum number of modules, a disadvantage of this method of supply is that short-circuit and cable break detection is not possible. However, this function is provided by the method of supply described in the next section.

## 5.2 Supply via MACX MCR-PTB... power terminals

For supplying power to MACX Analog modules, a particularly suitable method involves MACX MCR-PTB... power terminals (item no. 2865625). This means that a total current of 3.75 A can be supplied. Integrated error evaluation is an additional advantage here. An auxiliary supply failure or fuse fault is indicated by a relay contact and displayed via a flashing LED. Redundant supply is supported as an option. The decoupling of power supplies used for supply is ensured by the diodes integrated in the module. Moreover, it is possible to extend mechanical redundancy by using two power terminals. Each power terminal is protected by an integrated 5 A fuse. It is important to make sure here that tripping is guaranteed in the event of a short circuit by the power supply/supplies used. You can calculate the maximum number of modules, regardless of whether you are using one or two MACX MCR-PTB... modules, with the aid of the product documents using the formula below.

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{3{,}75\ A}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

If a power terminal without an integrated fuse is required, the power terminal (TC-MACX-MCR-PTB, item no. 2904673) can be used. In this case, a corresponding backup fuse must be ensured in the power supply.

### 5.2.1 Supply via a MACX MCR-PTB... power terminal

For supply via a power terminal, simple supply can be implemented by means of one power supply, see Figure 5-3 on page 45, or redundant supply by means of two different power supplies is implemented, see Figure 5-4 on page 45

Figure 5-3 Supply by means of one power supply

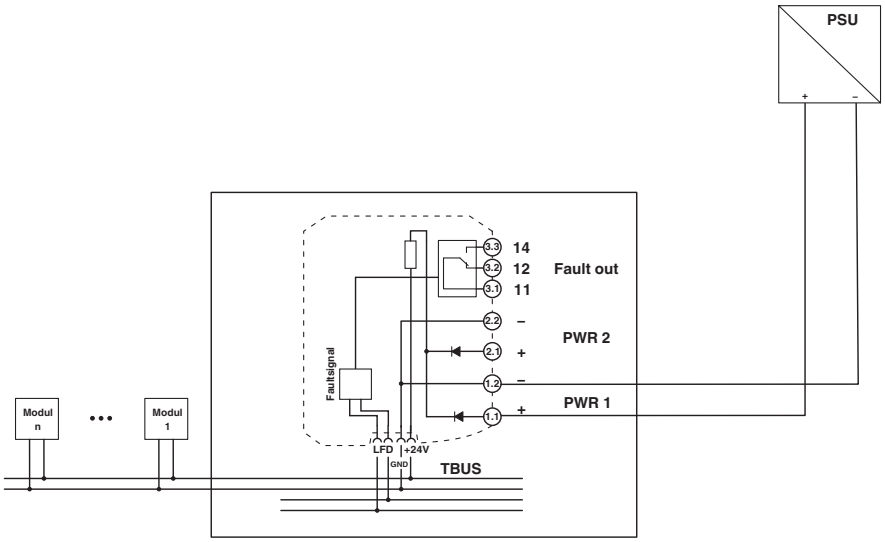
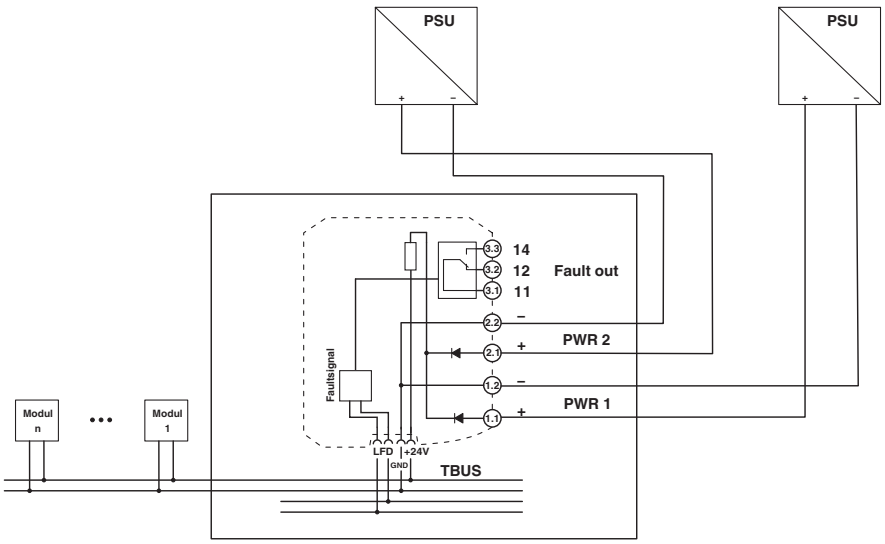



Figure 5-4 Supply by means of redundant power supplies



**Example for supply via a MACX MCR-PTB... power terminal**

The goal is to supply 32 MACX MCR-RTD-I-SP temperature measuring transducers (item no. 1050201), 40 MACX MCR-SL-NAM-R NAMUR signal conditioners (item no. 2865997) and 20 MACX MCR-SL-RPSSI-I repeater power supplies (item no. 2924207), at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducer, this is 40 mA per module and for the NAMUR signal conditioners, this is 21 mA. The intrinsically safe repeater power supplies require 76 mA each.

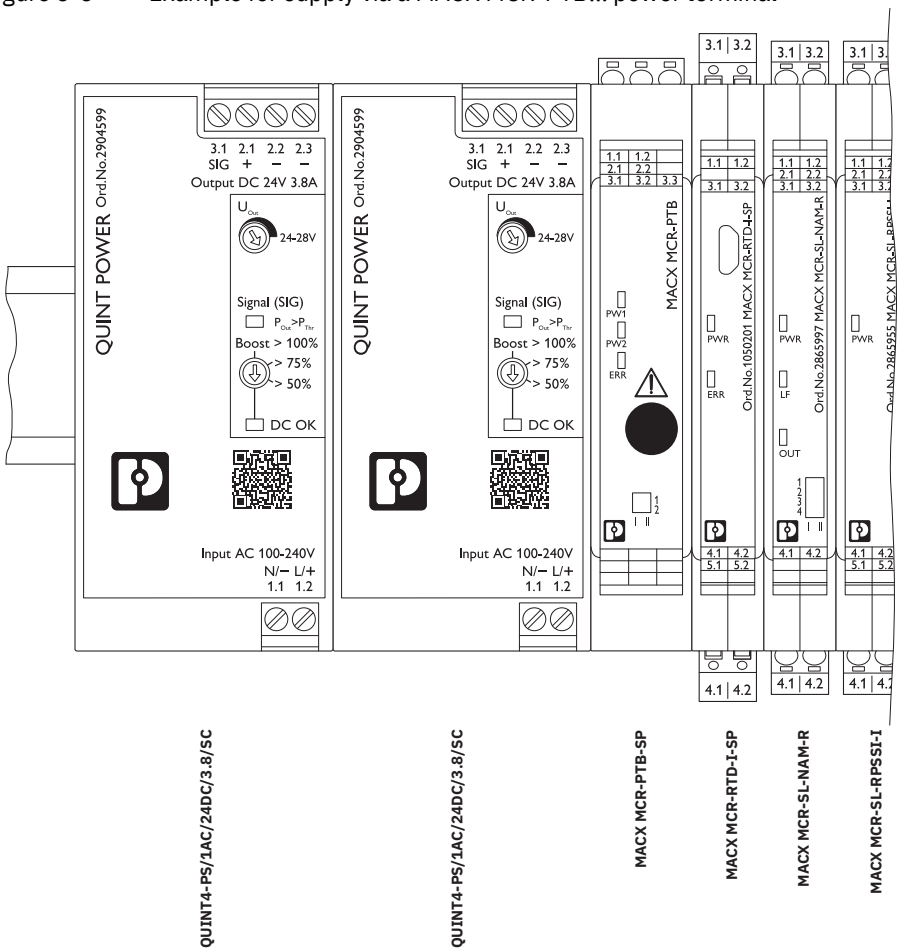
Then determine the maximum total current consumption of all 92 modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + ...$

$I = 32 * 40\ mA + 40 * 21\ mA + 20 * 76\ mA = 3640\ mA < 3750\ mA$

The total current consumption of 3640 mA is less than the maximum permissible current for supply via the MACX MCR-PTB.... To ensure that the fuse installed in the MACX MCR-PTB definitely trips in the event of a short circuit, the 24 V DC supply in this example is provided by two QUINT4-PS/1AC/24DC/3.8/SC power supplies (item no. 2904599). The structure is shown in Figure 5-5 on page 47. The wiring is as shown in Figure 5-4 on page 45.

Figure 5-5 Example for supply via a MACX MCR-PTB... power terminal




The disadvantage here is that in the event that the power terminal fails, the supply of all signal conditioners is interrupted.

### 5.2.2 Supply via two MACX MCR-PTB... power terminals

If redundant supply via two MACX MCR-PTB... power terminals is desired, the supply for each module must be provided by a separate voltage source, see Figure 5-3 on page 45. Likewise, you should also position the two modules at either end of the DIN rail in order to limit the maximum short-circuit current in the event of an error, see Figure 5-6 on page 49. A maximum current of 3.75 A must not be exceeded here. Redundant supply is thereby ensured. However, to increase the total number of signal conditioners, a maximum current of 6 A can be supplied via both power terminals (NOTE, no redundancy).

**NOTE: Functional limitation**
When supplying to the DIN rail connector via two MACX MCR-PTB(-SP) modules, the group error message must be deactivated.

**Example for the supply via two MACX MCR-PTB... power terminals**

As in the previous example, the goal is to provide a redundant supply to
32 MACX MCR-RTD-I-SP temperature measuring transducers (item no. 1050201),
40 MACX MCR-SL-NAM-R NAMUR signal conditioners (item no. 2865997) and
20 MACX MCR-SL-RPSSI-I repeater power supplies (item no. 2924207), at an operating voltage of 24 V DC.

First determine the current consumption of the modules from the packing slips. For the temperature measuring transducer, this is 40 mA per module and for the NAMUR signal conditioners, this is 21 mA. The intrinsically safe repeater power supplies also require 76 mA each.

Then determine the maximum total current consumption of all 92 modules.

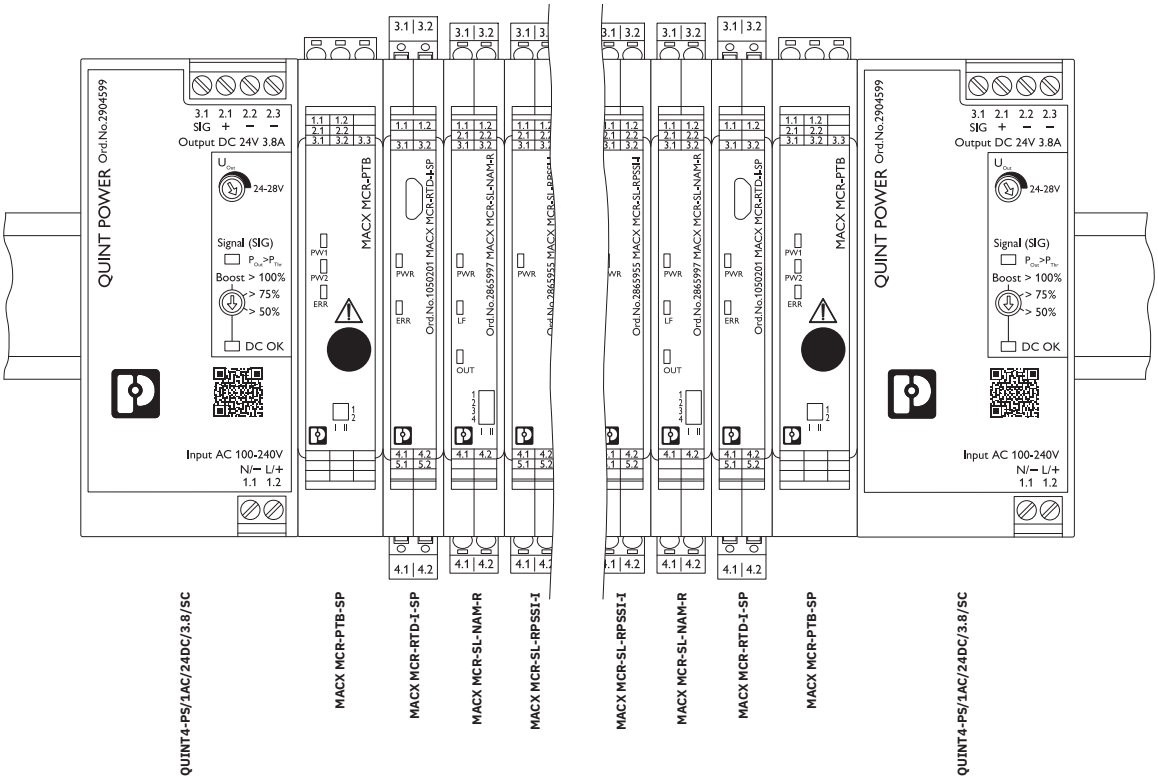
$$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

$$I = 32 * 40\ mA + 40 * 21\ mA + 20 * 76\ mA = 3640\ mA < 3750\ mA$$

The total current consumption of 3640 mA is less than the maximum permissible current for supply via the MACX MCR-PTB.... To ensure that the fuse installed in the MACX MCR-PTB definitely trips in the event of a short circuit, the 24 V DC supply in this example is provided by two QUINT4-PS/1AC/24DC/3.8/SC power supplies (item no. 2904599). The structure is shown in Figure 5-6 on page 49. The wiring is as shown in Figure 5-3 on page 45.

If a power terminal without an integrated fuse is required, the power terminal (TC-MACX-MCR-PTB, item no. 2904673) can be used. In this case, a corresponding backup fuse must be ensured in the power supply.

Figure 5-6 Example for the supply via two MACX MCR-PTB... power terminals

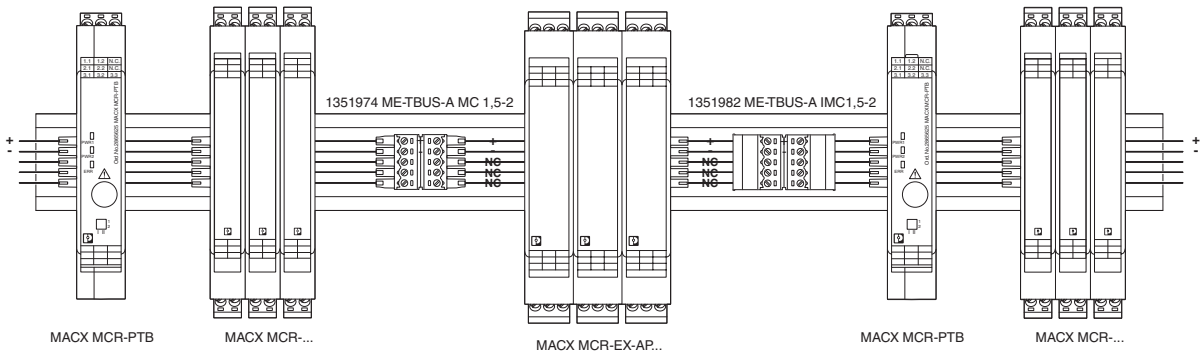


## 5.3 Supply via MACX MCR(-EX)-AP power module with DIN rail connector

The power and fault signaling module MACX MCR-PTB (item no. 2865625) or MACX MCR-PTB-SP (item no. 2924184) is used to supply the supply voltage to the DIN rail connector.

You also need the ME 17,5 TBUS DIN rail connector (item no. 1090049) and one ME-TBUS-A-MC 1,5-2 each (item no. 1351974) or ME-TBUS-A IMC1,5-2 (item no. 1351982).

Figure 5-7 Example of supply via power module MACX MCR(-EX)-AP with DIN rail connector




The DIN rail connectors ME-TBUS-A-MC 1,5-2 (item no. 1351974) and ME-TBUS-A IMC1,5-2 (item no. 1351982) do not support the transfer of group error messages.

## 5.4 Supply via system power supply

If there is no 24 V DC supply in the control cabinet or terminal box to supply the MACX Analog signal conditioners, it is recommended that you use MACX signal conditioners with wide-range power supply. However, if you want to avoid the complex single-core wiring, you can use a QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614). These power supplies, which have been developed specifically for measurement and control technology, enable the signal conditioners to be supplied directly from a 230 V AC supply via the TBUS DIN rail connector. These power supplies are simply snapped onto the TBUS and deliver a maximum current of 2.5 A. To increase performance, up to two QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614) can be snapped on. This means that a total current of 5 A can be supplied. Please note, however, that redundant supply is not possible for currents greater than 2.5 A. A 6 A, 10 A or 16 A characteristic B miniature circuit breaker should be used to protect the primary side.

Calculate the maximum number of modules with the aid of the relevant packing slips using the formula below:

$$n_{modules} = \frac{I_{max}}{I_N} = \frac{1{,}5\ A\ (3\ A)}{I_N}$$

$$I_N = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$$

### Example for supply via a system power supply

The goal is to supply 35 MACX MCR-RTD-I-SP temperature measuring transducers (item no. 1050201).

First determine the current consumption of the modules from the packing slips. For this temperature measuring transducer it is 40 mA per module.

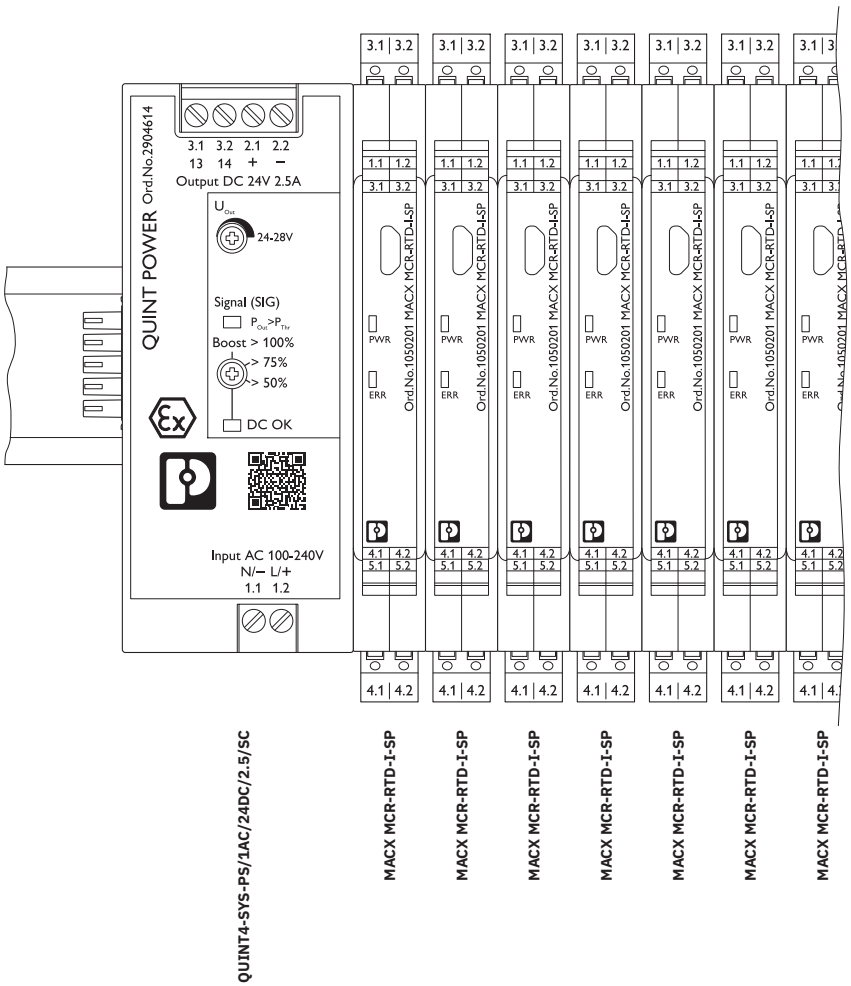
Then determine the maximum total current consumption of the 35 modules.

$I = n_1 * I_{module1} + n_2 * I_{module2} + n_3 * I_{module3} + \ldots$

$I = 35 * 40\ mA = 1400\ mA < 1500\ mA$

The total current consumption of 1400 mA is less than the maximum permissible current for supply via the QUINT4-SYS-PS/1AC/24DC/2.5/SC (item no. 2904614). The structure is shown in Figure 5-8 on page 52.

Figure 5-8 Example for supply via a system power supply



# A Appendix for document lists

## A 1 List of figures

### Section 2



### Section 3



### Section 4

# Section 5

# Please observe the following notes

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GERMANY

Should you have any suggestions or recommendations for improvement of the contents and layout of our manuals, please send your comments to:
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**phoenixcontact.com**



105810_en_02

# EU-Konformitätserklärung

EU Declaration of Conformity

Nr. / No. 083113343_07_DoC_EU

| | |
|---|---|
| Hersteller / Manufacturer: | **Phoenix Contact GmbH & Co. KG** |
| Anschrift / Address: | Flachsmarktstraße 8, 32825 Blomberg, Germany |
| Produktbezeichnung / Product designation: | **MACX MCR-EX-SL-2NAM-R-UP** |
| Artikel-Nr. / Order No.: | 2865984 |

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. Die in dieser Erklärung bezeichneten Produkte stimmen mit den einschlägigen Anforderungen der folgenden Harmonisierungsrechtsvorschriften überein:
This declaration of conformity is issued under the sole responsibility of the manufacturer. The products specified in this declaration are in conformity with the following relevant harmonization legislation:

| | |
|---|---|
| **2011/65/EU**<br>(OJ L 174, 1 July 2011) | **Beschränkung der Verwendung bestimmter gefährlicher Stoffe**<br>Restriction of the use of certain hazardous substances (RoHS) |
| **2014/30/EU**<br>(OJ L 96, 29 March 2014) | **EMV-Richtlinie (Elektromagnetische Verträglichkeit)**<br>Electromagnetic Compatibility Directive (EMC) |
| **2014/34/EU**<br>(OJ L 96, 29 March 2014) | **Geräte in explosionsgefährdeten Bereichen**<br>Equipment for explosive atmospheres (ATEX) |

Für die Beurteilung der Übereinstimmung wurden folgende einschlägige Normen herangezogen:
The following pertinent standards have been applied for the assessment of conformity:

**EN 60079-11:2012**
**EN IEC 60079-0:2018**
**EN IEC 60079-7:2015 + A1:2018**
**EN IEC 61000-6-4:2019**
**EN 61326-1:2013**
**EN IEC 60079-15:2019**
**EN IEC 61000-6-2:2019**
**EN IEC 63000:2018**

Ergänzende Informationen (z. B. Anmerkungen, Einschränkungen, etc.) zur Konformitätsbewertung:
Supplementary information (e.g., comments, restrictions, etc.) for conformity assessment:

IECEx IBE 10.0002X: IEC 60079-0:2017, IEC 60079-7:2017, IEC 60079-15:2017

Warnung: Dies ist ein Klasse A-Erzeugnis. In Wohngebieten kann es zu Störungen des Funkempfanges kommen. Der Betreiber soll entsprechende Schutzmaßnahmen treffen.
Warning: This is a Class A product. In a domestic environment it may cause radio interference, in which case the user may be required to take adequate measures.

Zertifikate einer benannten Stelle:
Certificates of a notified body:

**IBExU Institut für Sicherheitstechnik GmbH, Fuchsmühlenweg 7, 09599, Freiberg, DE**
Nr. / No.: 0637
Referenz / Reference: IBExU10ATEX1005X

Die nachfolgend aufgeführten Produkte sind ebenfalls Bestandteil dieser EU-Konformitätserklärung:
The products listed below are also part of this EU declaration of conformity:

| Artikel-Nr. / Order No. | Produktbezeichnung / Product designation |
|---|---|
| **2924249** | **MACX MCR-EX-SL-2NAM-R-UP-SP** |

Blomberg, 2023-08-29

i. A. Lars Wimmer

Lars-Peter Wimmer
Business Unit Interface Components
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Ansprechpartner / Contact person

i. V. Carsten Thörner

Carsten Thörner
Business Unit Interface Components
Vice President

Zeichnungsberechtigter / Authorized signatory

# UK Declaration of Conformity

UK-Konformitätserklärung

No. / Nr. 097106924_00_DoC_UK

| | |
|---|---|
| Manufacturer / Hersteller: | **PHOENIX CONTACT GmbH & Co. KG** |
| Address / Anschrift: | Flachsmarktstraße 8, 32825 Blomberg, Germany |
| Product designation / Produktbezeichnung: | **MACX MCR-EX-SL-2NAM-R-UP** |
| Order No. / Artikel-Nr.: | 2865984 |

This declaration of conformity is issued under the sole responsibility of the manufacturer above. The product(s) specified in this declaration is/are in conformity with the following relevant legislation:
Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. Die in dieser Erklärung bezeichneten Produkte stimmen mit den einschlägigen Anforderungen der folgenden Rechtsvorschriften überein:

| | |
|---|---|
| **S.I. 2012/3032** | **The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012**<br>Verordnung zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten 2012 |
| **S.I. 2016/1091** | **Electromagnetic Compatibility Regulations 2016**<br>Verordnung über elektromagnetische Verträglichkeit 2016 |
| **S.I. 2016/1107** | **Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016**<br>Verordnung für Geräte und Schutzsysteme zur Verwendung in explosionsgefährdeten Bereichen 2016 |

The following pertinent standards have been applied for the assessment of conformity:
Für die Beurteilung der Übereinstimmung wurden folgende einschlägige Normen herangezogen:

| | |
|---|---|
| **EN 60079-11:2012** | **EN 61326-1:2013** |
| **EN IEC 60079-0:2018** | **EN IEC 60079-15:2019** |
| **EN IEC 60079-7:2015 + A1:2018** | **EN IEC 61000-6-2:2019** |
| **EN IEC 61000-6-4:2019** | **EN IEC 63000:2018** |

Supplementary information (e.g., comments, restrictions, etc.) for conformity assessment:
Ergänzende Informationen (z. B. Anmerkungen, Einschränkungen, etc.) zur Konformitätsbewertung:

Warning: This is a Class A product. In a domestic environment it may cause radio interference, in which case the user may be required to take adequate measures.
Warnung: Dies ist ein Klasse A-Erzeugnis. In Wohngebieten kann es zu Störungen des Funkempfanges kommen. Der Betreiber soll entsprechende Schutzmaßnahmen treffen.

Certificates of an approved body:
Zertifikate einer zugelassenen Stelle:

**Eurofins E+E CML Limited, New Port Road, CH65 4LZ, Ellesmere Port, GB**
No. / Nr.: 2503
Reference / Referenz: CML 22UKEX3528X

The products listed below are also part of this UK declaration of conformity:
Die nachfolgend aufgeführten Produkte sind ebenfalls Bestandteil dieser UK-Konformitätserklärung:

| Order No. / Artikel-Nr. | Product designation / Produktbezeichnung |
|---|---|
| **2924249** | **MACX MCR-EX-SL-2NAM-R-UP-SP** |

Blomberg, 2023-01-05

i. A. P. Schnelle

Pascal Schnelle
Business Unit Interface Components
Manager MCR/Ex Development

Contact person / Ansprechpartner

i. V. Carsten Thörner

Carsten Thörner
Business Unit Interface Components
Vice President

Authorized signatory / Zeichnungsberechtigter

# [1] EU-TYPE EXAMINATION CERTIFICATE - Translation

[2] Equipment or protective systems
intended for use in potentially explosive atmospheres, Directive 2014/34/EU

[3] EU-type examination certificate number **IBExU10ATEX1005 X** | Issue 2

[4] Product: **NAMUR Switch Isolating Amplifier**
Type: MACX ****-EX-SL-xNAM-yR-UP(-SP)***

[5] Manufacturer: PHOENIX CONTACT GmbH & Co. KG

[6] Address: Flachsmarktstraße 8
32825 Blomberg
GERMANY

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH, notified body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report IB-21-3-0210/2.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:
EN IEC 60079-0:2018, EN IEC 60079-7:2015/A1:2018, EN 60079-11:2012 and
EN IEC 60079-15:2019
except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:

**Ⓔx I (M1) [Ex ia Ma] I**
**Ⓔx II (1) G [Ex ia Ga] IIC**
**Ⓔx II (1) D [Ex ia Da] IIIC**
**Ⓔx II 3(1) G Ex ec [ia Ga] nC IIC T4 Gc**

$-40\ °C \le T_{amb} \le +60\ °C / +70\ °C$

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

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Fax: + 49 (0) 37 31 / 38 05 10

By order

Dipl.-Ing.(FH) A. Henker

Zertifizierungsstelle Explosionsschutz IBExU Institut für Sicherheitstechnik GmbH 0637 Freiberg
- Seal
(notified body number 0637)

Certificates without signature and seal are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 2021-12-21

[13] **Schedule**

[14] **Certificate number IBExU10ATEX1005 X** | Issue 2

[15] **Description of product**
The NAMUR Switch Isolating Amplifiers MACX ***-EX-SL-xNAM-yR-UP(-SP)*** are used for the intrinsically safe and galvanically isolated operation of proximity switches with NAMUR behaviour or potential-free switches and resistance-connected switches. They are equipped with a wide voltage range supply. The equipment is provided for installation in zone 2 or in the safe area as associated apparatus. The intrinsically safe signal circuits may be routed into areas that require EPL Ma, Ga (Zone 0) or Da (Zone 20).
The voltage difference between input and output circuit or supply can be up to 375 V peak. The modules are equipped with a circuit for the detection of line faults.

**Technical data:**

**Environmental conditions**

| | |
|---|---|
| Ambient temperature range | -40 °C up to +60 °C<br>-40 °C up to +70 °C<br>(with ≥ 6 mm distance to other devices) |
| Degree of protection | ≥ IP20 (acc. to EN 60529) |

**Electrical data**

| | | | |
|---|---|---|---|
| 1. | **Power Supply (1.1 and 1.2) and TBUS** | | |
| | rated voltage range | $U_n$ | 24 ... 230 V DC or AC |
| | supply current | $I_n$ | < 42 mA (24 V DC);<br>max. < 80 mA (20 V AC) |
| | power consumption | $P_n$ | < 1.1 W |
| | maximum r.m.s. or d.c. voltage | $U_m$ | 253 V AC / 125 V DC |
| | galvanically separated up to a peak voltage | $U_p$ | 375 V |
| 2. | **Intrinsically safe sensor circuit (4.1 and 4.3/ 5.1 and 5.3)** | | |
| | maximum output voltage | $U_o$ | 9.56 V |
| | maximum output current | $I_o$ | 10.3 mA |
| | maximum output power | $P_o$ | 25 mW |
| | characteristic | | linear (928 Ω) |
| | effective internal capacity | $C_i$ | negligible |
| | effective internal inductivity | $L_i$ | negligible |
| 3. | **Relay output (2.1 and 2.3 / 3.1 and 3.3)** | | |
| | maximum Switching voltage | $U_s$ | 250 V AC (2 A) /<br>120 V DC (0.2 A) /<br>30 V DC (2 A) |
| | maximum switching power | $P_s$ | 500 VA |

Safety instructions:

For circuits including inductances and capacitances the following has to be observed:
The values for $L_o$ and $C_o$, mentioned in the EU-Type Examination certificate are allowed for:

- distributed inductance and capacitance e.g. as in a cable or
- if the total $L_i$ of the external circuit (excluding the cable) is < 1 % of the $L_o$ value or
- if the total $C_i$ of the external circuit (excluding the cable) is < 1 % of the $C_o$ value.

| | Ex ia IIC | Ex ia IIB/IIIC | Ex ia IIA |
|---|---|---|---|
| $C_o$ | 3.6 µF | 26 µF | 210 µF |
| $L_o$ | 300 mH | 1000 mH | 1000 mH |

The values of $L_o$ and $C_o$ determined in the EU-Type Examination shall be reduced to 50 % or taken from the following table if both of the following conditions are met:

- the total $L_i$ of the external circuit (excluding the cable) ≥ 1 % of the $L_o$ value and
- the total $C_i$ of the external circuit (excluding the cable) ≥ 1 % of the $C_o$ value.

The reduced capacitance of the external circuit (including cable) shall not be greater than 1 µF for Groups I, IIA, and IIB and 600 nF for Group IIC.

| | Ex ia IIC | | | | | Ex ia IIB/IIA, Ex ia IIIC | | | |
|---|---|---|---|---|---|---|---|---|---|
| $C_o$ | 510 nF | 580 nF | 600 nF | 600 nF | 600 nF | 1 µF | 1 µF | 1 µF | 1 µF |
| $L_o$ | 100 mH | 50 mH | 5 mH | 1 mH | 10 µH | 100 mH | 5 mH | 1 mH | 10 µH |

When using the device at altitudes between 2000 and 5000 m above sea level, the instructions in the operating manual must be observed.

Derating $T_{amb}$, $U_m$ and $U_{Isolation\ „ec"}$ as elevation above sea level increases:

| Height: | $T_{amb}$: | $T_{amb}$ with Derating*: | $U_m$: | $U_{Isolation\ „ec"}$: |
|---|---|---|---|---|
| ≤ 2000 m | -40 °C...+60 °C | -40 °C...+70 °C | 253 V AC / 125 V DC | 265 V |
| >2000 m ... ≤ 3000 m | -40 °C...+54 °C | -40 °C...+63 °C | 190 V AC / 110 V DC | 190 V |
| >3000 m ... ≤ 4000 m | -40 °C...+48 °C | -40 °C...+56 °C | 60 V | 60 V |
| >4000 m ... ≤ 5000 m | -40 °C...+42 °C | -40 °C...+49 °C | 60 V | 60 V |

* $T_{amb}$ with derating: With 6mm distance around all sides of the housing and only when mounted vertically (DIN rail horizontally).

*Variations compared to issue 1 of this certificate:*

*Variation 1*
The ambient temperature range has been extended to +70 °C.

[16] **Test report**
The test results are recorded in the confidential test report IB-21-3-0210/2 of 2021-12-13.
The test documents are part of the test report and they are listed there.

*Summary of the test results*
The NAMUR Switch Isolating Amplifiers type MACX ***-EX-SL-xNAM-yR-UP(-SP)*** mentioned under [4] further fulfil the requirements of explosion protection on an associated apparatus for Group I and II and Category M1 and 1G or 1D in type of protection intrinsic safety.
Additionally the NAMUR Switch Isolating Amplifiers fulfil the requirements of explosion protection of an electrical equipment for Equipment Group II and Category 3G in type of protection increased safety in combination with type of protection "n", sealed device "nc" and intrinsic safety.

[17] **Specific conditions of use**

- The NAMUR Switch Isolating Amplifiers MACX ***-EX-SL-xNAM-yR-UP(-SP)*** have to be installed in a certified housing fulfilling the requirements of EN IEC 60079-0 (min. IP54) or another recognized type of protection when installed in Zone 2 (category 3).
- Connecting and disconnecting of non-intrinsically safe circuits are not allowed in energized state in Zone 2.
- The DIP Switches may only be used if no explosive atmosphere is present.

[18] **Essential health and safety requirements**
In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:

None

[19] **Drawings and Documents**
The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

By order

Dipl.-Ing.(FH) A. Henker

Freiberg, 2021-12-21

# IECEx Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION
## IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

| | | | |
|---|---|---|---|
| Certificate No.: | **IECEx IBE 10.0002X** | Page 1 of 4 | Certificate history: |
| Status: | **Current** | Issue No: 4 | Issue 3 (2020-10-07)<br>Issue 2 (2016-04-14)<br>Issue 1 (2012-07-27)<br>Issue 0 (2010-04-06) |
| Date of Issue: | 2021-12-21 | | |

Applicant: **PHOENIX CONTACT GmbH & Co. KG**
Flachsmarktstraße 8
32825 Blomberg
**Germany**

Equipment: **NAMUR Switch Isolating Amplifier (Ex i and Non Ex i) type MACX *** (-EX)-SL-xNAM-yR-UP(-SP)...**

Optional accessory:

Type of Protection: **Intrinsic safety or increased safety in combination with intrinsic safety and type of protection "n"**

Marking: **type MACX ***-EX-SL-xNAM-yR-UP(-SP)....**

**[Ex ia Ma] I**
**[Ex ia Ga] IIC**
**[Ex ia Da] IIIC**

**Ex ec [ia Ga] nC IIC T4 Gc**
-40 °C ≤ $T_{amb}$ ≤ +60 °C / +70 °C

**type MACX ***-SL-xNAM-yR-UP(-SP)....**

**Ex ec nC IIC T4 Gc**
-40 °C ≤ $T_{amb}$ ≤ +60 °C / +70 °C

Approved for issue on behalf of the IECEx Certification Body: **Alexander Henker**

Position: **Deputy Head of department Certification Body**

Signature: (for printed version)

Date: 2021-12-21

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2. This certificate is not transferable and remains the property of the issuing body.
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Certificate issued by:

**IBExU Institut für Sicherheitstechnik GmbH**
**Fuchsmühlenweg 7**
**09599 Freiberg**
**Germany**

# IECEx Certificate of Conformity



Manufacturer: **PHOENIX CONTACT GmbH & Co. KG**
Flachsmarktstr. 8
32825 Blomberg
**Germany**

Additional manufacturing locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

**STANDARDS** :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-11:2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition:6.0

IEC 60079-15:2017 Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
Edition:5.0

IEC 60079-7:2017 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

**TEST & ASSESSMENT REPORTS:**
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

DE/IBE/ExTR10.0002/00 DE/IBE/ExTR10.0002/01 DE/IBE/ExTR10.0002/02
DE/IBE/ExTR10.0002/03 DE/IBE/ExTR10.0002/04

Quality Assessment Report:

NL/DEK/QAR11.0009/08

# IECEx Certificate of Conformity



**EQUIPMENT:**
Equipment and systems covered by this Certificate are as follows:

The NAMUR Switch Isolating Amplifiers MACX ***-EX-SL-xNAM-yR-UP(-SP)... are used for the intrinsically safe and galvanically isolated operation of proximity switches with NAMUR behaviour or potential-free switches and resistance-connected switches. They are equipped with a wide voltage range supply. The equipment is provided for installation in zone 2 or in the safe area as associated apparatus. The intrinsically safe signal circuits may be routed into areas that require EPL Ma, Ga (Zone 0) or Da (Zone 20).

The NAMUR Switch Isolating Amplifiers MACX ***-SL-xNAM-yR-UP(-SP)... are used for galvanically isolated operation of proximity switches with NAMUR behaviour or potential-free switches and resistance-connected switches. They are intended for the use in zone 2.

The voltage difference between input and output circuit or supply can be up to 375 V peak. The modules are equipped with a circuit for the detection of line faults.

The technical data are mentioned in the Annex.

**SPECIFIC CONDITIONS OF USE: YES as shown below:**
Special conditions for safe use in zone 2:

- The NAMUR Switch Isolating Amplifiers MACX ***(-EX)-SL-xNAM-yR-UP(-SP)... have to be installed in a certified housing fulfilling the requirements of IEC 60079-0 or another recognized type of protection for operation in zone 2.
- Connecting and disconnecting of non-intrinsically safe circuits are not allowed in energized state in Zone 2.
- The DIP Switches may only be used if no explosive atmosphere is present.

# IECEx Certificate of Conformity



**DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**
The ambient temperature range is extended to +70 °C.

**Annex:**

Annex_IBE10.0002_04.pdf

# IECEx Certificate of Conformity - Annex

Certificate No: IECEx IBE 10.0002X Issue No: 4

Date of Issue: 2021-12-21 

Technical data:
The following values apply for types: MACX ***-EX-SL-xNAM-yR-UP(-SP)...

| **Environmental data** | |
|---|---|
| Ambient temperature range | -40 °C up to + 60 °C<br>-40 °C up to + 70 °C<br>(with ≥ 6 mm distance to other devices) |
| Degree of protection of the enclosure | ≥ IP20 |

| **Electrical data** | | | |
|---|---|---|---|
| 1. | **Power Supply (1.1 and 1.2)** | | |
| | rated voltage range | $U_n$ | 24 ... 230 V DC or AC |
| | supply current | $I_n$ | < 42 mA (24 V DC); max. < 80 mA (20 V AC) |
| | power consumption | $P_n$ | < 1.1 W |
| | maximum r.m.s. or d.c. voltage | $U_m$ | 253 V AC / 125 DC |
| | galvanically separated up to a peak voltage | $U_p$ | 375 V |
| 2. | **Intrinsically safe sensor circuit (4.1 and 4.3/5.1 and 5.3)** | | |
| | maximum output voltage | $U_O$ | 9.56 V |
| | maximum output current | $I_O$ | 10.3 mA |
| | maximum output power | $P_O$ | 25 mW |
| | characteristic | | linear (928 Ω) |
| | internal capacitance, inductance | $C_i;L_i$ | negligible |
| 3. | **Relay output (2.1 ... 2.3 / 3.1 ... 3.3)** | | |
| | maximum switching voltage | $U_S$ | 250 V AC (2 A) /<br>120 V DC (0.2 A) /<br>30 V DC (2 A) |
| | maximum switching power | $P_S$ | 500 VA |

For circuits including inductances and capacitances the following has to be observed:
The values for $L_O$ and $C_O$, mentioned in this certificate are allowed for:

- distributed inductances and capacitances, e.g. as in a cable or
- if the total $L_i$ of the external circuit (excluding the cable) is < 1 % of the $L_O$ value or
- if the total Ci of the external circuit (excluding the cable) is < 1 % of the Co value.

| | Ex ia IIC | Ex ia IIB/IIIC | Ex ia IIA, Ex ia I |
|---|---|---|---|
| $C_O$ | 3.6 µF | 26 µF | 210 µF |
| $L_O$ | 300 mH | 1000 mH | 1000 mH |

The values of $L_O$ and $C_O$, mentioned in this certificate shall be reduced to 50 % or taken from the following table if both of the following conditions are met:

- the total Li of the external circuit (excluding the cable) is ≥ 1 % of the Lo value and
- the total Ci of the external circuit (excluding the cable) is ≥ 1 % of the Co value.

| | Ex ia IIC | | | | | Ex ia I, Ex ia IIB/IIA, Ex ia | | | |
|---|---|---|---|---|---|---|---|---|---|
| $C_O$ | 510 nF | 580 nF | 600 nF | 600 nF | 600 nF | 1 µF | 1 µF | 1 µF | 1 µF |
| $L_O$ | 100 mH | 50 mH | 5 mH | 1 mH | 10 µH | 100 mH | 5 mH | 1 mH | 10 µH |

# IECEx Certificate of Conformity - Annex



The reduced capacitance of the external circuit (including cable) shall not be greater than 1 µF for Groups I, IIA and IIB and 600 nF for Group IIC.

The following values apply for types: MACX ***-SL-xNAM-yR-UP-…

| **Environmental data** | |
|---|---|
| Ambient temperature range | -40 °C up to + 60 °C<br>-40 °C up to + 70 °C<br>(with ≥ 6 mm distance to other devices) |
| Degree of protection of the enclosure | ≥ IP 20 |

| **Electrical data** | | | |
|---|---|---|---|
| 1. | **Power Supply (1.1 and 1.2)** | | |
| | rated voltage range | $U_n$ | 24 ... 230 V DC or AC |
| | supply current | $I_n$ | < 42 mA (24 V DC); max. < 80 mA (20 V AC) |
| | power consumption | $P_n$ | < 1.1 W |
| | galvanically separated up to | U | 300 $V_{eff}$ according to IEC 61010 |
| 2. | **NAMUR sensor circuit (4.1 and 4.3/5.1 and 5.3)** | | |
| | rated output voltage | U | 8 V ± 10 % |
| | nominal output current | I | 8 mA ± 10 % |
| 3. | **Relay output (2.1 ... 2.3 / 3.1 ... 3.3)** | | |
| | maximum switching voltage | $U_S$ | 250 V AC (2 A) /<br>120 V DC (0.2 A) /<br>30 V DC (2 A) |
| | maximum switching power | $P_S$ | 500 VA |

If using the device in altitudes between 2000 and 5000 m above sea level the advices for derating from the instructions have to be taken into account.

Derating $T_{amb}$, $U_m$ and $U_{Isolation\ „ec“}$ as elevation above sea level increases:

| Height: | $T_{amb}$: | $T_{amb}$ with Derating*: | $U_m$: | $U_{Isolation\ „ec“}$: |
|---|---|---|---|---|
| ≤ 2000 m | -40 °C…+60 °C | -40 °C…+70 °C | 253 V AC / 125 V DC | 265 V |
| >2000 m … ≤ 3000 m | -40 °C…+54 °C | -40 °C…+63 °C | 190 V AC / 110 V DC | 190 V |
| >3000 m … ≤ 4000 m | -40 °C…+48 °C | -40 °C…+56 °C | 60 V | 60 V |
| >4000 m … ≤ 5000 m | -40 °C…+42 °C | -40 °C…+49 °C | 60 V | 60 V |

* $T_{amb}$ with derating: With 6mm distance around all sides of the housing and only when mounted vertically (DIN rail horizontally).

# EU-Declaration of conformity

en/de

*EU-Konformitätserklärung*

Pepperl+Fuchs SE
Lilienthalstraße 200
68307 Mannheim
Germany
Phone +49 621 776-0
Fax +49 621 776-1000

No. / *Nr.*: DOC-5088A
Date / *Datum*: 2022-09-22



PEPPERL+FUCHS

## Declaration of conformity / *Konformitätserklärung*

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **European Directives** and **standards**.

*Die Pepperl+Fuchs SE erklärt hiermit in alleiniger Verantwortung, dass die unten gelisteten **Produkte** den genannten **Europäischen Richtlinien** und **Normen** entsprechen.*

## Products / *Produkte*

| **Product** / *Produkt* | **Item number** | **Description** / *Beschreibung* |
|---|---|---|
| RC10-14-N3-Y95216 | 106545 | Inductive ring sensor |
| RJ15-N | 106556 | Inductive ring sensor |
| RC15-14-N0 | 095910 | Inductive ring sensor |
| RJ15-14-N | 106555 | Inductive ring sensor |
| RC15-14-N0-Y187459 | 187459 | Inductive ring sensor |
| RJ15-14-N-5M | 120803 | Inductive ring sensor |
| RC15-14-N0-Y54559 | 106546 | Inductive ring sensor |
| RC15-14-N0-Y95903 | 095903 | Inductive ring sensor |
| RC15-14-N3 | 051667 | Inductive ring sensor |
| RC15-14-N3-Y115615 | 115615 | Inductive ring sensor |
| RC15-14-N3-Y187457 | 187457 | Inductive ring sensor |
| RC15-14-N3-Y187458 | 187458 | Inductive ring sensor |
| RC10-14-N0 | 095912 | Inductive ring sensor |
| RC10-14-N0-Y180779 | 180779 | Inductive ring sensor |
| RC10-14-N0-Y187456 | 187456 | Inductive ring sensor |
| RC10-14-N0-Y95902 | 095902 | Inductive ring sensor |
| RC10-14-N3 | 051666 | Inductive ring sensor |
| RC10-14-N3-Y110970 | 110970 | Inductive ring sensor |
| RC10-14-N3-Y115614 | 115614 | Inductive ring sensor |
| RC10-14-N3-Y187454 | 187454 | Inductive ring sensor |
| RC10-14-N3-Y187455 | 187455 | Inductive ring sensor |
| RC15-14-N3-Y49839 | 106549 | Inductive ring sensor |
| RC10-14-N3-Y53478 | 106544 | Inductive ring sensor |
| RC15-14-N3-Y53479 | 106550 | Inductive ring sensor |

## Directives and Standards / *Richtlinien und Normen*

| **EU-Directive** *EU-Richtlinie* | **Standards** *Normen* |
|---|---|
| ATEX 2014/34/EU (L96/309-356) | EN 60079-11:2012-01<br>EN IEC 60079-0:2018-07 |
| EMC 2014/30/EU (L96/79-106) | EN 60947-5-6:2000-01<br>EN IEC 60947-5-2:2020-03 |
| RoHS 2011/65/EU (L174/88-110) | EN IEC 63000:2018-12 |

## Affixed CE Marking / *Angebrachte CE-Kennzeichnung*

CE 0102

## Signatures / *Unterschriften*

Mannheim, 2022-09-22

ppa. Wolfgang Helm
Director
Business Unit Sensors

i.V. Ulrich Ehrenfried
Head of Innovation Unit
Electromagnetic Sensors

## ANNEX ATEX

**Notified Body QM-System** / Notifizierte Stelle des QM-Systems
Physikalisch Technische Bundesanstalt (0102)
Bundesallee 100
38116 Braunschweig
Germany

**Marking and Certificates** / *Kennzeichnung und Zertifikate*

| Marking *Kennzeichnung* | Certificate *Zertifikat* | Issuer ID *Aussteller* ID |
|---|---|---|
| Ex II 2 G | PTB 99 ATEX 2128 X | 0102 |

**Key for Issuer ID** / *Schlüssel zur Aussteller ID*

| **ID** | **Issuer** / *Aussteller* |
|---|---|
| 0102 | Physikalisch Technische Bundesanstalt<br>Bundesallee 100<br>38116 Braunschweig<br>Germany |

# UK-Declaration of conformity

**en**

Pepperl+Fuchs SE
Lilienthalstrasse 200
68307 Mannheim
Germany
Phone +49 621 776-0
Fax +49 621 776-1000

No: DOC-6565A
Date: 2022-09-22


**www.pepperl-fuchs.com**

PEPPERL+FUCHS

## Declaration of conformity

We, Pepperl+Fuchs SE declare under our sole responsibility that the **products** listed below are in conformity with the listed **UK Regulations** as indicated below and amended by **UK SI 2019 No. 696**, and **standards**.

## Products

| Product | Item number | Description |
|---|---|---|
| RC10-14-N3-Y95216 | 106545 | Inductive ring sensor |
| RJ15-N | 106556 | Inductive ring sensor |
| RC15-14-N0 | 095910 | Inductive ring sensor |
| RJ15-14-N | 106555 | Inductive ring sensor |
| RC15-14-N0-Y187459 | 187459 | Inductive ring sensor |
| RJ15-14-N-5M | 120803 | Inductive ring sensor |
| RC15-14-N0-Y54559 | 106546 | Inductive ring sensor |
| RC15-14-N0-Y95903 | 095903 | Inductive ring sensor |
| RC15-14-N3 | 051667 | Inductive ring sensor |
| RC15-14-N3-Y115615 | 115615 | Inductive ring sensor |
| RC15-14-N3-Y187457 | 187457 | Inductive ring sensor |
| RC15-14-N3-Y187458 | 187458 | Inductive ring sensor |
| RC10-14-N0 | 095912 | Inductive ring sensor |
| RC10-14-N0-Y180779 | 180779 | Inductive ring sensor |
| RC10-14-N0-Y187456 | 187456 | Inductive ring sensor |
| RC10-14-N0-Y95902 | 095902 | Inductive ring sensor |
| RC10-14-N3 | 051666 | Inductive ring sensor |
| RC10-14-N3-Y110970 | 110970 | Inductive ring sensor |
| RC10-14-N3-Y115614 | 115614 | Inductive ring sensor |
| RC10-14-N3-Y187454 | 187454 | Inductive ring sensor |
| RC10-14-N3-Y187455 | 187455 | Inductive ring sensor |
| RC15-14-N3-Y49839 | 106549 | Inductive ring sensor |
| RC10-14-N3-Y53478 | 106544 | Inductive ring sensor |
| RC15-14-N3-Y53479 | 106550 | Inductive ring sensor |

## Regulations and Standards

| UK Regulation | Standards |
|---|---|
| UK SI 2012 No. 3032 (RoHS) | EN IEC 63000:2018-12 |
| UK SI 2016 No. 1091 (EMC) | EN 60947-5-6:2000-01<br>EN IEC 60947-5-2:2020-03 |
| UK SI 2016 No. 1107 (EX) | EN 60079-11:2012-01<br>EN IEC 60079-0:2018-07 |

## Affixed UKCA Marking

UK CA 2503

## Signatures

Mannheim, 2022-09-22

ppa. Wolfgang Helm
Director
Business Unit Sensors

i.V. Ulrich Ehrenfried
Head of Innovation Unit
Electromagnetic Sensors

## ANNEX UK SI 2016 No. 1107 (EX)

**Approved Body QM-System:**
Eurofins E&E CML Limited (2503)
Newport Business Park - New Port Road
CH65 4LZ Ellesmere Port
United Kingdom

**Marking and Certificates**

| Marking | Certificate | ID |
|---|---|---|
| Ex II 2 G | CML 21UKEX21274X | 2503 |

**Key for ID**

| ID | Responsible Body |
|---|---|
| 2503 | Eurofins E&E CML Limited<br>Newport Business Park - New Port Road<br>CH65 4LZ Ellesmere Port<br>United Kingdom |

# Physikalisch-Technische Bundesanstalt

**Braunschweig und Berlin**

(1) # EC-TYPE-EXAMINATION CERTIFICATE

**(Translation)**

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

**PTB 99 ATEX 2128 X**

(4) Equipment: Ring initiator types RJ..., RC... and TG...

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: D-68307 Mannheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 99-29058.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 50014:1997** **EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

**Ex II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, August 10, 1999

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2128 X

(15) Description of equipment

The ring initiators of types RJ..., RC... and TG... are used to convert displacements into electrical signals.

The ring initiators may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the explosion group of the intrinsically safe ring initiators depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and
supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB
..... resp. EEx ib IIC/IIB
only for connection to certified intrinsically safe circuits
Maximum values:

| type 1 | type 2 | type 3 |
|---|---|---|
| $U_i$ = 16 V | $U_i$ = 16 V | $U_i$ = 16 V |
| $I_i$ = 25 mA | $I_i$ = 25 mA | $I_i$ = 52 mA |
| $P_i$ = 34 mW | $P_i$ = 64 mW | $P_i$ = 169 mW |

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of ring intiators are shown in the table:

## SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2128 X

| types | $L_i$ | $C_i$ | type 1 | | | type 2 | | | type 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | maximum permissible ambient temperature in °C for application in temperature class | | | | | | | | |
| | [µH] | [nF] | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 |
| RJ10-N... | 20 | 30 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ10-...-N... | 20 | 30 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ10-Bi... | 20 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ10-...-Bi... | 20 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC10-...-N0... | 100 | 150 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC10-...-N3... | 120 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG10 | 20 | 30 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG10-1 | 100 | 150 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG10-bi | 20 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG10-1bi | 120 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ15-N... | 20 | 130 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ15-...-N... | 20 | 130 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ15-Bi... | 50 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ15-...-Bi... | 50 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC15-...-N0... | 100 | 150 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC15-...-N3... | 70 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG15 | 20 | 130 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG15-1 | 100 | 150 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG15-bi | 50 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| TG15-1bi | 70 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ21-N... | 25 | 30 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ21-Bi... | 50 | 70 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ43-N... | 50 | 40 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |

(16) Test report PTB Ex 99-29058

(17) Special conditions for safe use

1. For the application within a temperature range of -60°C to -20 °C the ring initiators of types RJ..., RC... and TG... must be protected against damage due to impact by mounting into an additional housing.
2. The connection facilities of the ring initiators of types RJ..., RC... and TG... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.

3. The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of ring initiators is shown in the table given under item (15) of this EC-type-examination certificate..
4. Inadmissible electrostatic charge of the plastic housing of the ring initiators of types RJ43-...-N..., RJ21-...-N... and RJ21-...-Bi... has to be avoided. A warning label on the device shall point to this danger.

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, August 10, 1999

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

# 1. SUPPLEMENT

**according to Directive 94/9/EC Annex III.6**

## to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2128 X

## (Translation)

Equipment: Ring initiator, types RJ..., RC... and TG...

Marking: Ⓔx **II 2 G EEx ia IIC T6**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

The modifications concern the consideration of the current state of the applied standards and – resulting from this – the marking of the ring initiators, types RJ..., RC... and TG..., the way how to affix the marking on the equipment as well as the internal construction (inclusion of further alternative casting resin materials, wrapping PCB´s with PTFE-tape). The "Electrical Data", the "Special Conditions" as well as all other specifications apply without changes.

In the future the marking will read:

Ⓔx **II 2 G Ex ia IIC T6...T1 Gb**

Applied standards

**EN 60079-0:2012, EN 60079-11:2012**

Test report: PTB Ex 15-24246

ZSEx10101e b

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, April 28, 2015

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Sheet 1/1

# UK Type Examination Certificate CML 21UKEX21274X Issue 0

**United Kingdom Conformity Assessment**

1 Product or Protective System Intended for use in Potentially Explosive Atmospheres UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

2 Equipment **Ring Initiators Types RJ… and RC…**

3 Manufacturer **Pepperl+Fuchs SE**

4 Address **Lilienthalstrasse 200**
**68307 Mannheim**
**Germany**

5 The equipment is specified in the description of this certificate and the documents to which it refers.

6 Eurofins E&E CML Limited, Newport Business Park, New Port Road, Ellesmere Port, CH65 4LZ, United Kingdom, Approved Body Number 2503, in accordance with Regulation 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.

The examination and test results are recorded in the confidential reports listed in Section 12.

7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to specific conditions of use (affecting correct installation or safe use). These are specified in Section 14.

8 This UK Type Examination certificate relates only to the design and construction of the specified equipment. Further requirements of the Regulations apply to the manufacturing process and supply of the product. These are not covered by this certificate.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN IEC 60079-0:2018 EN 60079-11:2012

10 The equipment shall be marked with the following:

II 2 G

Ex ia IIC T6…T1 Gb

L. A. Brisk
Certification Officer

## 11 Description

The ring initiators of types RJ... and RC ... are used to convert displacements into electrical signals.

The level of protection as well as the explosion group of the intrinsically safe ring initiators depend on the intrinsically safe supply circuit connected to the initiators.

The changes concern the application of the state of the standard EN IEC 60079-0:2018, the reduction of the scope of the EU-Type Examination Certificate to the types listed in table 2 as well as the legal form of the manufacturing company.

**Electrical data**

Evaluation and supply circuit.. only for connection to certified intrinsically safe circuits
Ex ia IIC/IIB or Ex ib IIC/IIB for EPL Gb

Maximum values:

| Type 1 | Type 2 | Type 3 |
|---|---|---|
| Ui =16V | Ui =16V | Ui =16V |
| Ii= 25 mA | Ii= 25 mA | Ii = 52 mA |
| Pi = 34mW | Pi =64mW | Pi = 169 mW |

Table 1

For relationship between type of connected circuit, maximum permissible ambient temperature for the application as EPL Gb-equipment and temperature class as well as the effective internal reactances for the individual types of ring initiators, reference is made to the following table 2.

| | | | Type 1 | | | Type 2 | | | Type 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Types** | **Li [µH]** | **Ci [nF]** | Maximum permissible ambient temperature in °C for the application in temperature class | | | | | | | | |
| | | | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 | T6 | T5 | T4-T1 |
| RC10-…-N0… | 100 | 150 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC10-…-N3… | 120 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ15-N… | 20 | 130 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RJ15-…-N… | 20 | 130 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC15-…-N0… | 100 | 150 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |
| RC15-…-N3… | 70 | 90 | 75 | 90 | 100 | 70 | 85 | 100 | 55 | 70 | 90 |

Table 2

## 12 Certificate history and evaluation reports

| Issue | Date | Associated report | Notes |
|---|---|---|---|
| 0 | 05 Nov 2021 | R14112BU/00 | Prime Certificate issued. |

Note: Drawings that describe the equipment are listed or referred to in the Annex.

## 13 Conditions of Manufacture

None.

## 14 Specific Conditions of Use

The following conditions relate to safe installation and/or use of the equipment.

i. The relationship between type of the connected circuit, maximum permissible ambient temperature for adherence to the temperature class as well as the effective internal reactance for the individual types of ring initiators is specified in tables 1 and 2 of this certificate or in the operating instructions manual.

ii. The ring initiators shall be protected against mechanical damage due to impact if they are applied within an ambient temperature range of -60C to -20 °C. An ambient temperature below -60 °C is not permitted.

iii. The connection facilities of the ring initiators shall be installed as such that a minimum degree of protection of IP20 according to IEC 60529 is met.

iv. For the application of the following ring initiators in hazardous areas of group II appropriate measures shall be taken to protect the free surface of the encapsulation against mechanical damage if the encapsulation surface is freely accessible after installation.
   a. Types
   b. RC10-...-N0...
   c. RC10- ...-N3...
   d. RJ15-N...
   e. RJ15-... -N ...
   f. RC15- ...-N0...
   g. RC15- ...-N3...

# Certificate Annex

| | |
|---|---|
| **Certificate Number** | **CML 21UKEX21274X** |
| **Equipment** | **Ring Initiators Types RJ… and RC…** |
| **Manufacturer** | **Pepperl+Fuchs SE** |

The following documents describe the equipment defined in this certificate:

**Issue 0**

For drawings describing the equipment, refer to attached certificate PTB 99ATEX2128X. In addition to the drawings listed on PTB 99ATEX2128X the following drawings include the additional marking required for this UK Type Examination certification:

| Drawing No | Sheets | Rev | Approved date | Title |
|---|---|---|---|---|
| 16-1555CM-10 | 1 to 2 | 0 | 05 Nov 2021 | Additional Marking Requirements for UKCA |

# RMA-Formular und Erklärung über Dekontaminierung
# Formulaire RMA et déclaration de décontamination

RMA-Nr./ Numéro de renvoi

**Die RMA-Nr. bekommen Sie von Ihrem Ansprechpartner im Vertrieb oder Service. Bei Rücksendung eines Altgeräts zur Entsorgung tragen Sie bitte in das Feld der RMA-Nr. "WEEE" ein./ Le numéro d'autorisation de retour (RMA) est mis à votre disposition par votre interlocuteur à la vente ou au service. Lors du renvoi d'un appareil usagée en vue de sa mise au rebut, veuillez saisir "WEEE" dans le champ du n° RMA.**

**Zu diesem Rücksendeschein gehört eine Dekontaminierungserklärung. Die gesetzlichen Vorschriften schreiben vor, dass Sie uns diese Dekontaminierungserklärung ausgefüllt und unterschrieben zurücksenden müssen. Bitte füllen Sie auch diese im Sinne der Gesundheit unserer Mitarbeiter vollständig aus./ Une déclaration de décontamination fait partie intégrante de ce bulletin de retour. Les prescriptions légales vous obligent à nous renvoyer cette déclaration de décontamination remplie et signée. Veuillez la remplir également complètement au sens de la santé de nos employés.**

**Firma/ Société**

Firma/ Société

Straße/ Rue

PLZ, Ort/ CP, localité

Land/ Pays

**Ansprechpartner/ Interlocuteur**

Name/ Nom

Abt./ Dépt.

Tel./ Tél.

E-Mail

Gerät/ Appareil

Anzahl/ Nombre

Serien-Nr./ N° de série

Artikel-Nr./ N° d'article

Auftragsnr./ Numéro de commande

**Grund der Rücksendung/ Motif du retour**

- ☐ Kalibrierung/ Calibrage
- ☐ Modifikation/ Modification
- ☐ Reklamation/ Réclamation
- ☐ Reparatur/ Réparation
- ☐ Elektroaltgerät/ Appareil électrique usagé (WEEE)
- ☐ andere/ autre

bitte spezifizieren/ veuillez spécifier

**Ist das Gerät möglicherweise kontaminiert?/ L'appareil a-t-il été utilisé ?**

☐ Nein, da das Gerät nicht mit gesundheitsschädlichen Stoffen betrieben wurde./ Non, car l'appareil n'a pas été utilisé avec des substances dangereuses pour la santé.

☐ Nein, da das Gerät ordnungsgemäß gereinigt und dekontaminiert wurde./ Non, car l'appareil a été nettoyé et décontaminé en bonne et due forme.

☐ Ja, kontaminiert mit:/ Oui, contaminé avec:

| ☐ explosiv/ explosif | ☐ entzündlich/ inflammable | ☐ brandfördernd/ comburant | ☐ komprimierte Gase/ gaz comprimés | ☐ ätzend/ corrosif | ☐ giftig, Lebensgefahr/ toxique, danger de mort | ☐ gesundheitsgefährdend/ dangereux pour la santé | ☐ gesundheitsschädlich/ nocif pour la santé | ☐ umweltgefährdend/ dangereux pour l'environnement |
|---|---|---|---|---|---|---|---|---|

**Bitte Sicherheitsdatenblatt beilegen!/ Merci de joindre la fiche technique de sécurité**

Das Gerät wurde gespült mit:/ L'appareil a été rincé avec:

*Diese Erklärung wurde korrekt und vollständig ausgefüllt und von einer dazu befugten Person unterschrieben. Der Versand der (dekontaminierten) Geräte und Komponenten erfolgt gemäß den gesetzlichen Bestimmungen.*

*Cette déclaration a été correctement complétée et signée par une personne autorisée. L'envoi des appareils et composants (décontaminés) se fait selon les conditions légales.*

Falls die Ware nicht gereinigt, also kontaminiert bei uns eintrifft, muss die Firma Bühler sich vorbehalten, diese durch einen externen Dienstleister reinigen zu lassen und Ihnen dies in Rechnung zu stellen.

Si la marchandise nous est retournée sans avoir été nettoyée, donc toujours contaminée, la société Bühler se réserve le droit de faire nettoyer le produit par un prestataire externe et de vous envoyer la facture correspondante.

Firmenstempel/ Cachet de l'entreprise

Datum/ Date

rechtsverbindliche Unterschrift/ Signature autorisée



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Internet: www.buehler-technologies.com

### Vermeiden von Veränderung und Beschädigung der einzusendenden Baugruppe

Die Analyse defekter Baugruppen ist ein wesentlicher Bestandteil der Qualitätssicherung der Firma Bühler Technologies GmbH. Um eine aussagekräftige Analyse zu gewährleisten muss die Ware möglichst unverändert untersucht werden. Es dürfen keine Veränderungen oder weitere Beschädigungen auftreten, die Ursachen verdecken oder eine Analyse unmöglich machen.

### Umgang mit elektrostatisch sensiblen Baugruppen

Bei elektronischen Baugruppen kann es sich um elektrostatisch sensible Baugruppen handeln. Es ist darauf zu achten, diese Baugruppen ESD-gerecht zu behandeln. Nach Möglichkeit sollten die Baugruppen an einem ESD-gerechten Arbeitsplatz getauscht werden. Ist dies nicht möglich sollten ESD-gerechte Maßnahmen beim Austausch getroffen werden. Der Transport darf nur in ESD-gerechten Behältnissen durchgeführt werden. Die Verpackung der Baugruppen muss ESD-konform sein. Verwenden Sie nach Möglichkeit die Verpackung des Ersatzteils oder wählen Sie selber eine ESD-gerechte Verpackung.

### Einbau von Ersatzteilen

Beachten Sie beim Einbau des Ersatzteils die gleichen Vorgaben wie oben beschrieben. Achten Sie auf die ordnungsgemäße Montage des Bauteils und aller Komponenten. Versetzen Sie vor der Inbetriebnahme die Verkabelung wieder in den ursprünglichen Zustand. Fragen Sie im Zweifel beim Hersteller nach weiteren Informationen.

### Einsenden von Elektroaltgeräten zur Entsorgung

Wollen Sie ein von Bühler Technologies GmbH stammendes Elektroprodukt zur fachgerechten Entsorgung einsenden, dann tragen Sie bitte in das Feld der RMA-Nr. „WEEE“ ein. Legen Sie dem Altgerät die vollständig ausgefüllte Dekontaminierungserklärung für den Transport von außen sichtbar bei. Weitere Informationen zur Entsorgung von Elektroaltgeräten finden Sie auf der Webseite unseres Unternehmens.

### Éviter la modification et la détérioration du module à expédier

L'analyse d'unités défectueuses est un élément essentiel de l'Assurance Qualité de la société Bühler Technologies GmbH. Pour garantir une analyse pertinente, la marchandise doit être si possible contrôlée en l'état. Aucune modification ne doit être réalisée ni autre dommage se produire car les causes pourraient alors être masquées ou toute analyse serait rendue impossible.

### Manipulation des modules à sensibilité électrostatique

Dans le cas d'unités électroniques, il peut s'agir de composants sensibles aux charges électrostatiques. Les composants doivent être traités en respectant les directives en matière de décharges électrostatiques. Selon le cas, les composants devraient être remplacés à un poste de travail ESD. Si cela n'est pas possible, des mesures respectant les directives en matière de décharges électrostatiques devraient être prises lors du remplacement. Le transport ne doit être réalisé que dans des conditions respectant les directives en matière de décharges électrostatiques. Les emballages des composants doivent être en conformité avec les directives en matière de décharges électrostatiques. Utilisez selon le cas l'emballage de pièces de rechange ou choisissez vous-même un emballage en conformité avec les directives en matière de décharges électrostatiques.

### Montage de pièces de rechange

Veillez lors de l'insertion d'une pièce de rechange à ce que les conditions décrites ci-dessus soient respectées. Veillez à ce que le montage du produit et de tous les composants soit fait de manière appropriée. Remettez tous les câbles dans leur état d'origine avant la mise en service du produit. En cas de doute, adressez-vous au fabricant du produit pour avoir plus d'informations.

### Renvoi d'appareils électriques usagés en vue de leur mise au rebut

Si vous souhaitez expédier un produit électrique manufacturé par Bühler Technologies GmbH en vue de sa mise au rebut correcte, veuillez saisir "WEEE" dans le champ du n° RMA. Pour le transport, joignez à l'appareil usagé la déclaration de décontamination entièrement remplie et bien visible de l'extérieur. Vous trouverez davantage d'informations concernant la mise au rebut des appareils électriques usagés sur le site Internet de notre entreprise.



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